FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 2B24(174)HES		1
STATE	STATE DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0073	02	088, ETC	US 281

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT
PROJECT NO.: STP 2B24(174)HES
CCSJ: 0073-02-088, ETC.

BEXAR, ETC

LIMITS FROM: MARTHA WALK
TO: BEXAR/ATASCOSA COUNTY LINE

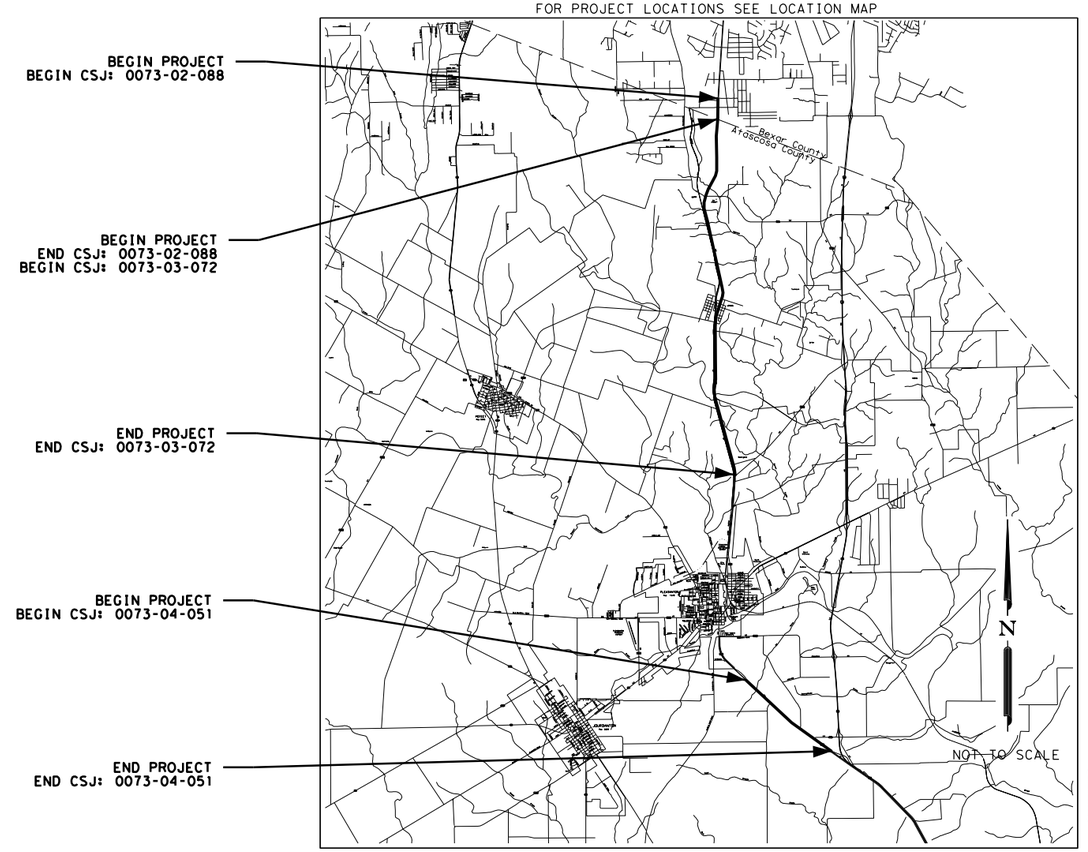
NET LENGTH OF PROJECT = 12.51MI

DESIGN SPEED = 70 MPH
AREA OF DISTURBED SOIL:
CSJ: 0073-02-088 = 0.54 AC
CSJ: 0073-03-072 = 6.03 AC
CSJ: 0073-04-051 = 2.49 AC
ADT: 5931

INDEX OF SHEETS

SEE SHEET 3 FOR INDEX OF SHEETS

FOR WORK CONSISTING OF HAZARD ELIMINATION & SAFETY - INSTALL MEDIAN CABLE BARRIER
FOR PROJECT LOCATIONS SEE LOCATION MAP



FINAL PLANS

LETTING DATE: _____

DATE CONTRACTOR BEGAN WORK: _____

DATE WORK WAS ACCEPTED: _____

FINAL CONTRACT COST: $ _____

CONTRACTOR: _____

PLANS PREPARED BY:

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, OCTOBER 23, 2023)

EXCEPTIONS: NONE
EQUATIONS: NONE
R.R. CROSSINGS: NONE

SUBMITTED FOR LETTING: 4/1/2024
DocuSigned by: Orlando Gallegos, P.E.
446D458C802A437...
TRANSPORTATION ENGINEER SUPERVISOR

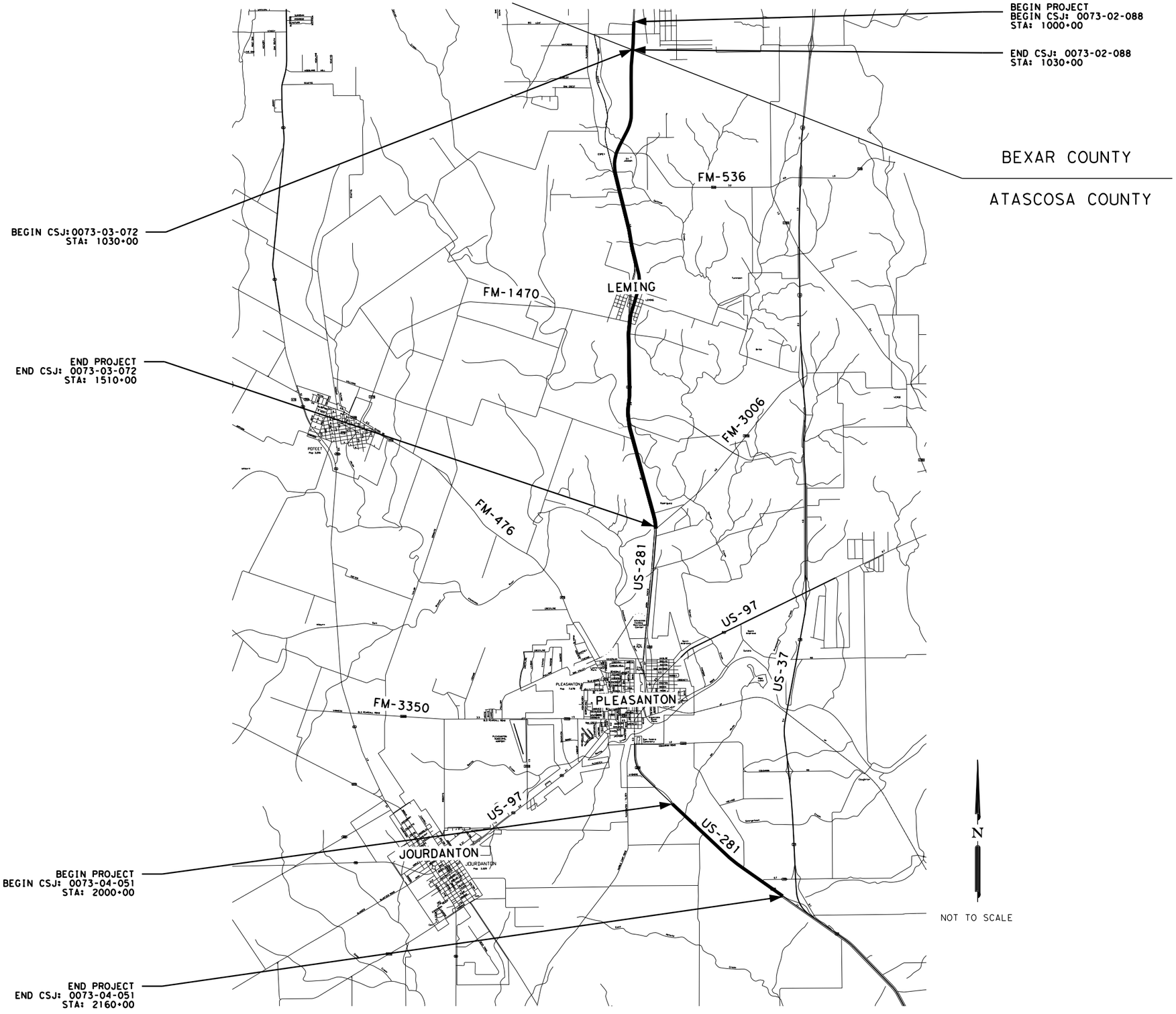
RECOMMENDED FOR LETTING: 4/1/2024
DocuSigned by: Clayton Ripps, PE
74F59ACB883D4EB...
DEPUTY DISTRICT ENGINEER

REVIEWED FOR LETTING: 4/1/2024
DocuSigned by: DCRogers, P.E.
F29100BAA508499...
TRANSPORTATION ENGINEER SUPERVISOR

APPROVED FOR LETTING: 4/1/2024
DocuSigned by: Charles C. Benavides, P.E.
3BB8A8580ACE41C...
DISTRICT ENGINEER

COUNTY _____ PROJ. NO. _____
HWY. NO. _____ LETTING DATE _____
DATE ACCEPTED _____

Design Filename: P:\122\96\02\Tasks\13_US 281 Cable Barrier\Design\Civil\General\1229602_13_GNRL_TITL.dgn Plotted on: 3/27/2024



DESIGN

STATE OF TEXAS
JUSTIN W. CLARK
118715
LICENSED
PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 3/19/2024 DATE

APPROVAL

STATE OF TEXAS
GILMER D. GASTON
80472
LICENSED
PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 3/19/2024 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

US 281: CABLE BARRIER

LOCATION MAP

GENERAL

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	2

Plotted on: 3/19/2024

Design Filename: P:\122\96\02\Tasks\13_US 281 Cable Barrier\Design\Civil\General\1229602_13_GNRL_LMAP.dgn

SHEET NO.	DESCRIPTION
	GENERAL
1	TITLE
2	LOCATION MAP
3	PROJECT INDEX
4-8	GENERAL NOTES
9-11	QUANTITY SUMMARY
12	TMA SUMMARY
13	ESTIMATE AND QUANTITY
14-16	TYPICAL SECTIONS
	TCP
17	TCP NARRATIVE
18	SCHEDULE OF BARRICADES AND DEVICES
19	TCP TYPICAL SECTIONS
	TCP STANDARDS
20	* TCP(5-1)-18
21	* TCP(6-1)-12
22	* BC(1)-21
23	* BC(2)-21
24	* BC(3)-21
25	* BC(4)-21
26	* BC(5)-21
27	* BC(6)-21
28	* BC(7)-21
29	* BC(8)-21
30	* BC(9)-21
31	* BC(10)-21
32	* BC(11)-21
33	* BC(12)-21
	ROADWAY
34-67	PROPOSED CABLE BARRIER LAYOUT
	ROADWAY - STANDARDS
68-70	* BRIFEN(TL4)-14
71	* CASS(TL-4)-14
72	* GBRLTR(TL-4)-14
73-74	* NU-CABLE(TL-4)-14
	SW3P
75-80	* STORM WATER POLLUTION PLAN (SW3P)
	ENVIRONMENTAL - STANDARDS
81	* EPIC
82	* EC(1)-16
83-85	* EC(9)-16

DESIGN

STATE OF TEXAS — JUSTIN W. CLARK — 118715 — LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 3/19/2024 DATE

APPROVAL

STATE OF TEXAS — GILMER D. GASTON — 80472 — LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 3/19/2024 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

Texas Department of Transportation

US 281: CABLE BARRIER

PROJECT INDEX

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	3

Plotted on: 3/19/2024

Design Filename: P:\122\96\02\Tasks\13_US 281 Cable Barrier\Design\Civil\General\1229602_13_INDEX.dgn

**********GENERAL NOTES**********
2014 Specification Book

--General--
Contact the Engineer or the City when construction operations are within 400 feet of a signalized intersection to determine/verify the location of loop detectors, conduit, ground-boxes, etc. Repair or replace any signal equipment damaged by construction operations. The method of repair or replacement shall be pre-approved and inspected. Depending on the type and extent of the damage, the Engineer reserves the right to perform the repair or replacement work and the Contractor will be billed for this work.

City of San Antonio: (210) 207-8642

Any materials removed and not reused and determined to be salvageable shall be stored within the project limits at an approved location or delivered undamaged to the storage yard as directed. Deface traffic signs so that they will not reappear in public as signs.

Any sign panels that are adjusted or removed and replaced, shall be done the same workday unless otherwise approved. This work shall be considered subsidiary to Item 502.

Notify the Engineer at least two weeks prior to a proposed traffic pattern change(s) that will require a revision to traffic signals.

Locate and reference all manholes and valves within the construction area with station and offset or GPS. Each manhole and valve shall be identified by its owner (SAWS, CPS, etc.). No roadwork will begin until this list has been submitted. All valves and manhole covers have to be accessible at all times, therefore; temp. CTB, material stockpiles, etc. cannot be placed over these valves or covers.

The Contractor has the option to adjust or construct all manholes and valves to final pavement elevations prior to the final mat of HMA or after final mat of HMA. If between the final elevation adjustment and the final mat of HMA, the manholes and valves are going to be exposed to traffic, place temporary asphalt around the manhole and valve to provide a +/- 50:1 taper. The cost of elevation adjustment and the concrete apron around the manhole and valve will be part of the manhole and valve work. The asphalt tapers are part of the HMA work.

Hurricane Evacuation

Hurricane Season is from June 1 thru November 30. As the closest metropolitan city inland from the Texas Coast, the City of San Antonio is a major shelter destination during mandatory hurricane evacuations. As such, planned work zone lane or road closures may be restricted and/or suspended during mandatory hurricane evacuation operations. The District will coordinate these restrictions at a minimum H-120 from any projected impact to the Texas Coast.

Control: 0073-02-088, ETC.

County: BEXAR, ETC.

Highway: US 281

No time charges will be made if the Engineer determines that work on the project was impacted by the hurricane.

The Engineer may order changes in the Traffic Control Plan to accommodate evacuation traffic, and may suspend the work, all or in part, to ensure timely completion of this work. All work to implement changes in the Traffic Control Plan will be paid through existing bid prices or through Item 9.5, Force Account. However, the Department will not entertain any request for delay damages, loss of efficiency that may be attributed to the restriction or suspension of road or lane closures, or to changes in the Traffic Control Plan.

Submit locate request for SAWS water and sewer to TXDOTlocates@saws.org.

In accordance with the Underground Facility Damage Prevention Act (One Call Bill) the phone number for a utility locator is 811. It is the Contractor's responsibility to plan for utility locators as needed.

Underground utilities owned by the Texas Department of Transportation may be present within the Right-Of-Way. Call or email the TxDOT offices listed below for locates a minimum of 48 hours in advance of excavation. If city or town owned irrigation facilities are present, call the appropriate department of the local city or town a minimum of 48 hours in advance of excavation. The Contractor is liable for all damages incurred to the above-mentioned utilities when working without having the utilities located prior to excavation.

For signal and ITS locates call TransGuide at 210-731-5136 or email sat_its_locates@txdot.gov for ITS locates and signal.request@txdot.gov for signal locates.

Contractor questions on this project are to be addressed to the following individual(s):
Orlando Gallegos,Orlando.Gallegos@TxDOT.gov
Thanya Tarrosa, Thanya.Tarrosa@TxDOT.gov

Contractor questions will be accepted through email, phone and in person by the above individuals. Questions may also be submitted via the Letting Pre-Bid Q&A web page. This webpage can be accessed from the Notice to Contractors dashboard located at the following Address:
https://tableau.txdot.gov/views/ProjectInformationDashboard/NoticetoContractors

All contractor questions will be reviewed by the Engineer. All questions and any corresponding responses that are generated will be posted through the same Letting Pre-Bid Q&A web page.

The Letting Pre-Bid Q&A web page for each project can be accessed by using the dashboard to navigate to the project you are interested in by scrolling or filtering the dashboard using the controls on the left. Hover over the blue hyperlink for the project you want to view the Q&A for and click on the link in the window that pops up.

--Item 5--
Taper ACP placed at curb inlets, traffic inlets and slotted drains.

A horizontal boom or equivalent equipment is required for construction in the vicinity of the CPS Energy electric lines to provide vertical clearance of equipment during construction. Contact CPS Energy Utility Coordination Group sixteen (16) week in anticipation of pole bracing. The estimated duration for pole bracing is 6 to 10 weeks (or longer if temporary construction easements are required) after invoice is paid. For de-energizing or sleeving of the overhead electrical lines depicted on the plans, please contact CPS Energy Utility Coordination Group sixteen (16) week in anticipation of needed de-energization. The estimated duration for de-energizing is approximately 4 to 6 weeks (after invoice is paid) but could vary on system scenario and back feed requirements. De-energizing may not be possible in all instances or may be restricted during specific periods of time due to load demand. Contractor will be reimbursed for the invoice cost for pole bracing and/or de-energizing or sleeving through force account.

Prevention of Migratory Bird Nesting

It is anticipated that migratory birds, a protected group of species, may try to nest on bridges, culverts, vegetation, or gravel substrate, at any time of the year. The preferred nesting season for migratory birds is from February 15 through October 1. When practicable, schedule construction operations outside of the preferred nesting season. Otherwise, nests containing migratory birds must be avoided and no work will be performed in the nesting areas until the young birds have fledged.

Structures

Bridge and culvert construction operations cannot begin until swallow nesting prevention is implemented, until after October 1 if it's determined that swallow nesting is actively occurring, or until it's determined swallow nests have been abandoned. If the State installed nesting deterrent on the bridges and culverts, maintain the existing nesting deterrent to prevent swallow nesting until October 1 or completion of the bridge and culvert work, whichever occurs earlier. If new nests are built and occupied after the beginning of the work, do not perform work that can interfere with or discourage swallows from returning to their nests. Prevention of swallow nesting can be performed by one of the following methods:

1. By February 15 begin the removal of any existing mud nests and all other mud placed by swallows for the construction of nests on any portion of the bridge and culverts. The Engineer will inspect the bridges and culverts for nest building activity. If swallows begin nest building, scrape, or wash down all nest sites. Perform these activities daily unless the Engineer determines the need to do this work more frequently. Remove nests and mud through October 1 or until bridge and culvert construction operations are completed.

2. By February 15 place a nesting deterrent (which prevents access to the bridge and culvert by swallows) on the entire bridge (except deck and railing) and culverts. This work is subsidiary to the various bid items.

No extension of time or compensation payment will be granted for a delay or suspension of work caused by nesting swallows.

Excavation within 5 feet of an existing CPS Energy pole will require pole bracing. Contact CPS Energy utility coordination to request pole bracing (Customer Engineering 210-353-4050). The estimated duration for the pole bracing process is approximately 10 to 15 weeks.

--Item 6--
Show the stockpile lot and/or sub lot numbers on all tickets for all materials.

Steel Wrapped or Asbestos Utility Lines:

Existing steel wrapped natural gas and/or asbestos cement (AC) water lines that will no longer be in service are usually abandoned in place (AIP). However, if any of these lines have to be removed for whatever reason (in the way of other construction, to make tie-ins, etc.), comply with Item 6.

If removal of AC water lines is included in the construction contract, then notify the Engineer of proposed dates of removal of the AC water lines in accordance to Item 6. Excavate to the top of the AC water line to allow a separate contractor hired by the State to remove the AC water line. The excavation for the AC water line removal is subsidiary to the work that created the need for the removal (excavation for structures, roadway, a new line, tie-ins, etc.).

To comply with the latest provisions of Build America, Buy America Act (BABA Act) of the Bipartisan Infrastructure Law, the contractor must submit a notarized original of the TxDOT Construction Material Buy America Certification Form for all items classified as construction materials. This form is not required for materials classified as a manufactured product. Refer to the Buy America Material Classification Sheet for clarification on material categorization.

The Buy America Material Classification Sheet is located at the below link. https://www.txdot.gov/business/resources/materials/buy-america-material-classification-sheet.html for clarification on material categorization.

--Item 7--
The project's total disturbed area is 9.06 acres. The disturbed area in all project locations and Contractor project specific locations (PSL's), within 1/4 mile of the project limits, will further establish the authorization requirements for storm water discharges. The department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality

(TCEQ) for the construction activities shown on the plans. Obtain any required authorization from the TCEQ for any PSL's on or off the ROW. When the total area disturbed on the project and PSL's within 1/4 mile of the project exceeds 5 acres, provide a copy of the Contractor NOI for PSL's to the Engineer (to the appropriate MS4 operator when the project is on an off-state system route).

No significant traffic generators events identified.

Law Enforcement patrol vehicles must be marked as "Police".

--Item 8--
Working days will be computed and charged in accordance with Article 8.3.1.4. Standard Work Week.

A Special Provision to Item 8 for a delayed authorized date to begin work has been included in the contract. The reason for including the Special Provision is for material processing or contractor mobilization.

Create and maintain a Bar Chart schedule.

--Item 9--
When approved, provide uniformed, off-duty law enforcement officers with marked vehicles during work that requires a lane closure. The officer in marked vehicles shall be located as approved to monitor or direct traffic during the closure. The method used to direct traffic at signalized intersections shall be as approved. Additional officers and vehicles may be provided when approved or directed.

Complete the daily tracking form provided by the department and submit invoices that agree with the tracking form for payment at the end of each month approved services were provided.

Show proof of certification by the Texas Commission on Law Enforcement Standards.

All law enforcement personnel used in Work Zone Traffic Control shall be trained for performing duties in work zones and are required to take "Safe and Effective Use of Law Enforcement Personnel in Work Zones" (Course #133119) which can be found online at the following site: www.nhi.fhwa.dot.gov

Certificates of completion should be available to all who finish the course. These should be kept by the officers to substantiate completion when reporting to the work site.

Minimums, scheduling fees, etc. will not be paid; TxDOT will consider paying cancellation fees on a case-by-case basis.

--Item 132--
TY C Embankment shall meet the following specifications:

ITEM	*Description*	*Percent Retained-Sieve*				*LL Max*	*PI Max*	*PI Min*
		3"	*3/8"*	*#4*	*#40*			
132	*Embankment (ORD COMP)(TY C)*	*0*	*-*	*30-75*	*50-85*	*50*	*20*	*6*

--Item 164--
Drill seeding of permanent grasses requires the use of approved grass seeding equipment capable of properly storing and metering the release of small seeds (such as Bermuda grass) separately from fluffy type seeds (such as bluestems). Equipment manufactured for planting grain crops is acceptable for planting temporary cool season seeds, but not for planting the permanent seed mix.

If performing a permanent seeding in an area with established temporary grass cover and mowing is performed instead of tilling, seed and fertilizer may be distributed simultaneously during "Broadcast Seeding" operations, provided each component is applied at the specified rate.

--Item 168--
Apply vegetative watering as needed to supplement natural rainfall during the vegetation establishment period. Plan quantity of irrigation water is based on the application of a total of 1.3 gal of water each week for each sq. yd. of area that is sodded or seeded. Establishment time is estimated to be 12 weeks for both sod and permanent seed mixes. Temporary seeding will require less time for establishment. Provide a schedule and coordinate watering cycles and rates per cycle with the Engineer. Obtain approval if the quantity of water to be applied is expected to exceed the plan quantity. Adjust the amount of water applied with each cycle and the number of cycles each wk. according to actual site conditions. Drought or other conditions, as determined by the Engineer, may require the application of supplemental irrigation during hours other than normal working hours.

--Item 500--
"Materials on Hand" payments will not be considered in determining percentages for mobilization payments.

--Item 502--
General

In addition to providing a Contractor's Responsible Person and a phone number for emergency contact, have an employee available to respond on the project for emergencies and for taking corrective measures within 2 hours or within a reasonable time frame as specified by the Engineer.

Treat the pavement drop-offs as shown in the TCP.

Avoid placing stockpiles, equipment, and other construction materials within the roadway's horizontal clear zone or at any location that will constitute a hazard and will endanger traffic. If a stockpile is placed within the clear zone, address in accordance with the TMUTCD.

If Nighttime work is required and work is not behind positive barrier then full Class 3 reflective gear is required to be worn by all workers, hard hat halos are required to be worn by the flaggers at flagging stations, TY III barricades are required to be spaced at 500 ft, and a mandatory night work meeting is required.

The Contractor Force Account "Safety Contingency" that has been established for this project is intended to be utilized for work zone enhancements, to improve the effectiveness of the Traffic Control Plan, that could not be foreseen in the project planning and design stage. These enhancements will be mutually agreed upon by the Engineer and the Contractor's Responsible Person based on weekly or more frequent traffic management reviews on the project. The Engineer may choose to use existing bid items if it does not slow the implementation of enhancement.

Mounting and moving the mailbox as needed for the various construction phases is subsidiary to Item 502.

Access to adjoining property must be maintained at all times.

Barricades, Signs, and Traffic Control Devices

When advanced warning flashing arrow panels and/or changeable message sign is specified, have one standby unit in good condition at the job site. Standby time shall be considered subsidiary to the bid item.

After written notification, the time frame is provided on the Form 599 to provide properly maintained signs and barricades before considered in non-compliance with this item.

Moving an existing sign to a temporary location is subsidiary to Item 502. Installations with permanent supports at permanent locations will be paid for under the applicable bid item(s).

Cover permanent signs if not used. This is subsidiary to Item 502.

Lane and Ramp Closures and Detours

Notify the Engineer in writing 10 business days in advance of any temporary or permanent lane, ramp, connector, etc. closures/detours, restrictions to lane widths, alterations to vertical clearances, or modifications to radii. Any other modifications to the roadway that may adversely

affect the mobility of oversized/overweight trucks also require 10 business days advance written notice to the Engineer. At least one lane must always remain open.

For closures not listed in the TCP; the lane closures are limited to between the hours of 9AM-4PM, and at least one lane must remain open at all times.

At no time shall two consecutive intersecting roadways be closed at one time during construction.

At no time shall two consecutive ramps be closed at one time during construction or overlay operations.

Unless otherwise noted in the plans and/or as directed by the Engineer, daily lane closures shall be limited according to the following restrictions:

Nighttime: Ask the Area Engineer for the days and hours for nighttime work if the Area Engineer agrees to nighttime work.

Weekend closures when approved by the Engineer: Ask the Area Engineer for the days and hours for nighttime work if the Area Engineer agrees to nighttime work.

No lane closures will be permitted for the following dates and/or special events:
Between December 15 and January 1
Fiesta Week and Sales Tax Holidays (Bexar County Only)
Wednesday before Thanksgiving thru the Sunday after Thanksgiving
Saturday and Sunday before Memorial Day and Labor Day
Saturday or Sunday when July 4 falls on a Friday or Monday
Election days (Bexar County Only)
During major events at the AT&T Center (Spurs home games, Rodeo, concerts, etc.)
Alamodome, and/or Convention Center (Bexar County Only)
Saturday before and Monday After Easter – April 18-21, 2025

Hauling

The use of rubber-tired equipment will be required for moving dirt or other materials along or across pavement surfaces. Where the contractor desires to move any equipment not licensed for operation on public highways, on or across pavement, they shall protect the pavement from damage as directed/approved by the Engineer.

Throughout construction operations, the Contractor will be required to conduct their hauling operations in a manner such that vehicles will not haul over previously recompacted subgrade or compacted base material, except in short sections for dumping manipulations.

The Contractor shall keep the roadway clean and free of dirt or other materials during hauling operations. If the Contractor does not maintain a clean roadway, they shall cease all construction operations, when directed by the Engineer, to clean the roadway to the satisfaction of the Engineer.

--Item 506--
An Inspector will perform a regularly scheduled SWP3 inspection every 7 calendar days.

Failure to address items noted on the SW3P inspection report within two report cycles may result in the Department stopping all construction operations, exclusive of time charges, or withholding that month's estimate until the SW3P deficiencies are corrected unless the Engineer determines that the area is too wet to correct SW3P deficiencies.

Failure to correctly maintain daily monitoring reports and submitting to TxDOT on a daily/weekly basis may result in the monthly estimate being withheld.

--Item 543--
Withing 15 days of Notice to Proceed, Contractor shall provide correspondence from post and cable supplier on expected delivery date of material. Contractor shall execute the work to complete all work except the post and cable installation. Time will be suspended when this work is complete. Time will resume when installation of post and cable begins, within 20 days upon receipt of post and cable material, or within 20 days upon expected delivery date of material; whichever comes first.

--Item 6185--
6185-1 One (1) shadow vehicle with TMA will be required for this project. The TMA's will be measured and paid for by the DAY for each TMA/TA set up and operational on the worksite. The contractor will be responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMA's needed for the project. See TMA and TA Summary sheet in the plans.

CSJ: 0073-02-088

ITEM	0132-6021 *	0150-6002	0164-6035	0164-6051	0168-6001	0169-6001	0432-6066	0502-6001	0543-6002	0543-6020
LOCATION	EMBANKMENT (VEHICLE) (ORD COMP) (TY C)	BLADING	DRILL SEEDING (PERM) (RURAL) (CLAY)	DRILL SEED (TEMP) (WARM OR COOL)	VEGETATIVE WATERING	SOIL RETENTION BLANKETS (CL 1) (TY A)	RIPRAP (CL A) (MOW STRIP) (3 IN)	BARRICADES, SIGNS AND TRAFFIC HANDLING	CABLE BARRIER SYSTEM (TL-4)	CABLE BARRIER TERMINAL SECTION (TL-4)
	CY	HR	SY	SY	MG	SY	CY	MO	LF	EA
CABLE BARRIER LAYOUT BEGIN PROJECT TO STA 1020+00	11	8.0	1056	1056	16.47	1056	44		1584	3
CABLE BARRIER LAYOUT STA 1020+00 TO STA 1030+00	7	5.0	667	667	10.41	667	28		1000	
TRAFFIC CONTROL PLAN								1		
TOTALS	18	13.0	1723	1723	26.88	1723	72	1	2584	3

* CONTRACTOR TO USE AS NEEDED IF BLADING ALONE IS NOT SUFFICIENT FOR GRADING

ITEM	6001-6002	6185-6002
LOCATION	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONARY)
	EA	DAY
CABLE BARRIER LAYOUT BEGIN PROJECT TO STA 1020+00		
CABLE BARRIER LAYOUT STA 1020+00 TO STA 1030+00		
TRAFFIC CONTROL PLAN	2	7
TOTALS	2	7

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

US 281: CABLE BARRIER

QUANTITY SUMMARY

SHEET 1 OF 3

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	9

Plotted on: 3/19/2024

Design Filename: P:\122\96\02\Tasks\13_US 281 Cable Barrier\Design\Civil\General\1229602_13_RDWY_QTY.dgn

CSJ: 0073-03-072

ITEM	0132-6021 *	0150-6002	0164-6035	0164-6051	0168-6001	0169-6001	0432-6066	0502-6001	0506-6038	0506-6039
LOCATION	EMBANKMENT (VEHICLE) (ORD COMP) (TY C)	BLADING	DRILL SEEDING (PERM) (RURAL) (CLAY)	DRILL SEED (TEMP) (WARM OR COOL)	VEGETATIVE WATERING	SOIL RETENTION BLANKETS (CL 1) (TY A)	RIPRAP (CL A) (MOW STRIP) (3 IN)	BARRICADES, SIGNS AND TRAFFIC HANDLING	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)
	CY	HR	SY	SY	MG	SY	CY	MO	LF	LF
CABLE BARRIER LAYOUT STA 1030+00 TO STA 1040+00	2	3.0	180	180	2.81	180	8		100	100
CABLE BARRIER LAYOUT STA 1040+00 TO STA 1060+00	11	8.0	997	997	15.55	997	42			
CABLE BARRIER LAYOUT STA 1060+00 TO STA 1080+00	12	9.0	1134	1134	17.69	1134	47		100	100
CABLE BARRIER LAYOUT STA 1080+00 TO STA 1100+00	2	2.0	199	199	3.10	199	8		100	100
CABLE BARRIER LAYOUT STA 1100+00 TO STA 1120+00	12	10.0	1185	1185	18.49	1185	49		100	100
CABLE BARRIER LAYOUT STA 1120+00 TO STA 1140+00	11	8.0	1017	1017	15.87	1017	42			
CABLE BARRIER LAYOUT STA 1140+00 TO STA 1160+00	12	10.0	1158	1158	18.06	1158	48		100	100
CABLE BARRIER LAYOUT STA 1160+00 TO STA 1180+00	10	9.0	972	972	15.16	972	41		100	100
CABLE BARRIER LAYOUT STA 1180+00 TO STA 1200+00	12	10.0	1166	1166	18.19	1166	49		100	100
CABLE BARRIER LAYOUT STA 1200+00 TO STA 1220+00	12	10.0	1166	1166	18.19	1166	49			
CABLE BARRIER LAYOUT STA 1220+00 TO STA 1240+00	12	9.0	1143	1143	17.83	1143	48		100	100
CABLE BARRIER LAYOUT STA 1240+00 TO STA 1260+00	10	10.0	990	990	15.44	990	41		100	100
CABLE BARRIER LAYOUT STA 1260+00 TO STA 1280+00	6	5.0	605	605	9.44	605	25			
CABLE BARRIER LAYOUT STA 1300+00 TO STA 1320+00	8	8.0	784	784	12.23	784	33			
CABLE BARRIER LAYOUT STA 1320+00 TO STA 1340+00	9	8.0	857	857	13.37	857	36		100	100
CABLE BARRIER LAYOUT STA 1340+00 TO STA 1360+00	2	5.0	197	197	3.07	197	8			
CABLE BARRIER LAYOUT STA 1360+00 TO STA 1380+00	12	9.0	1129	1129	17.61	1129	47		100	100
CABLE BARRIER LAYOUT STA 1380+00 TO STA 1400+00	12	10.0	1160	1160	18.10	1160	48			
CABLE BARRIER LAYOUT STA 1400+00 TO STA 1420+00	8	8.0	761	761	11.87	761	32		48	48
CABLE BARRIER LAYOUT STA 1420+00 TO STA 1440+00	11	8.0	1079	1079	16.83	1079	45			
CABLE BARRIER LAYOUT STA 1440+00 TO STA 1460+00	7	8.0	646	646	10.08	646	27		300	300
CABLE BARRIER LAYOUT STA 1460+00 TO STA 1480+00	5	4.0	433	433	6.75	433	18			
CABLE BARRIER LAYOUT STA 1480+00 TO STA 1500+00	5	4.0	500	500	7.80	500	21			
TRAFFIC CONTROL PLAN								3		
TOTALS	203	175.0	19458	19458	303.53	19458	812	3	1448	1448

* CONTRACTOR TO USE AS NEEDED IF BLADING ALONE IS NOT SUFFICIENT FOR GRADING

ITEM	0506-6040	0506-6043	0543-6002	0543-6020	6001-6002	6185-6002
LOCATION	BIODEG EROSN CONT LOGS (INSTL) (8")	BIODEG EROSN CONT LOGS (REMOVE)	CABLE BARRIER SYSTEM (TL-4)	CABLE BARRIER TERMINAL SECTION (TL-4)	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONARY)
	LF	LF	LF	EA	EA	DAY
CABLE BARRIER LAYOUT STA 1030+00 TO STA 1040+00			270	1		
CABLE BARRIER LAYOUT STA 1040+00 TO STA 1060+00			1495	3		
CABLE BARRIER LAYOUT STA 1060+00 TO STA 1080+00	20	20	1701	2		
CABLE BARRIER LAYOUT STA 1080+00 TO STA 1100+00	20	20	298	2		
CABLE BARRIER LAYOUT STA 1100+00 TO STA 1120+00	20	20	1778	2		
CABLE BARRIER LAYOUT STA 1120+00 TO STA 1140+00			1525	2		
CABLE BARRIER LAYOUT STA 1140+00 TO STA 1160+00	20	20	1737	3		
CABLE BARRIER LAYOUT STA 1160+00 TO STA 1180+00	20	20	1458	3		
CABLE BARRIER LAYOUT STA 1180+00 TO STA 1200+00	20	20	1749	2		
CABLE BARRIER LAYOUT STA 1200+00 TO STA 1220+00			1749	2		
CABLE BARRIER LAYOUT STA 1220+00 TO STA 1240+00	20	20	1714	2		
CABLE BARRIER LAYOUT STA 1240+00 TO STA 1260+00	20	20	1485	4		
CABLE BARRIER LAYOUT STA 1260+00 TO STA 1280+00			908	1		
CABLE BARRIER LAYOUT STA 1300+00 TO STA 1320+00	20	20	1176	3		
CABLE BARRIER LAYOUT STA 1320+00 TO STA 1340+00	20	20	1285	3		
CABLE BARRIER LAYOUT STA 1340+00 TO STA 1360+00	20	20	296	1		
CABLE BARRIER LAYOUT STA 1360+00 TO STA 1380+00	20	20	1694	2		
CABLE BARRIER LAYOUT STA 1380+00 TO STA 1400+00	20	20	1740	2		
CABLE BARRIER LAYOUT STA 1400+00 TO STA 1420+00	40	40	1142	4		
CABLE BARRIER LAYOUT STA 1420+00 TO STA 1440+00			1619	2		
CABLE BARRIER LAYOUT STA 1440+00 TO STA 1460+00			969	1		
CABLE BARRIER LAYOUT STA 1460+00 TO STA 1480+00	20	20	650	2		
CABLE BARRIER LAYOUT STA 1480+00 TO STA 1500+00			750	2		
TRAFFIC CONTROL PLAN					2	50
TOTALS	320	320	29188	51	2	50

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

US 281: CABLE BARRIER

QUANTITY SUMMARY

SHEET 2 OF 3

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	10

Plotted on: 3/19/2024
Design Filename: P:\122\96\02\Tasks\13_US 281 Cable Barrier\Design\Civil\General\1229602_13_RDWY_QTY.dgn

CSJ: 0073-04-051

ITEM	0132-6021 *	0150-6002	0164-6035	0164-6051	0168-6001	0169-6001	0432-6066	0502-6001	0506-6038	0506-6039
LOCATION	EMBANKMENT (VEHICLE) (ORD COMP) (TY C)	BLADING	DRILL SEEDING (PERM) (RURAL) (CLAY)	DRILL SEED (TEMP) (WARM OR COOL)	VEGETATIVE WATERING	SOIL RETENTION BLANKETS (CL 1) (TY A)	RIPRAP (CL A) (MOW STRIP) (3 IN)	BARRICADES, SIGNS AND TRAFFIC HANDLING	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)
	CY	HR	SY	SY	MG	SY	CY	MO	LF	LF
CABLE BARRIER LAYOUT BEGIN PROJECT TO STA 2020+00	9	7.0	824	824	12.85	824	34			
CABLE BARRIER LAYOUT STA 2020+00 TO STA 2040+00	11	9.0	1017	1017	15.87	1017	42		100	100
CABLE BARRIER LAYOUT STA 2040+00 TO STA 2060+00	11	9.0	1034	1034	16.13	1034	43		125	125
CABLE BARRIER LAYOUT STA 2060+00 TO STA 2080+00	12	10.0	1141	1141	17.80	1141	48		175	175
CABLE BARRIER LAYOUT STA 2080+00 TO STA 2100+00	14	10.0	1331	1331	20.76	1331	55		200	200
CABLE BARRIER LAYOUT STA 2100+00 TO STA 2120+00	11	9.0	1062	1062	16.57	1062	44		100	100
CABLE BARRIER LAYOUT STA 2120+00 TO STA 2140+00	11	9.0	1066	1066	16.63	1066	44		100	100
CABLE BARRIER LAYOUT STA 3040+00 TO STA 3060+00	6	5.0	569	569	8.88	569	24		100	100
TRAFFIC CONTROL PLAN								2		
TOTALS	85	68.0	8044	8044	125.49	8044	334	2	900	900

* CONTRACTOR TO USE AS NEEDED IF BLADING ALONE IS NOT SUFFICIENT FOR GRADING

ITEM	0543-6002	0543-6020	6001-6002	6185-6002
LOCATION	CABLE BARRIER SYSTEM (TL-4)	CABLE BARRIER TERMINAL SECTION (TL-4)	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONARY)
	LF	EA	EA	DAY
CABLE BARRIER LAYOUT BEGIN PROJECT TO STA 2020+00	1236	2		
CABLE BARRIER LAYOUT STA 2020+00 TO STA 2040+00	1525	2		
CABLE BARRIER LAYOUT STA 2040+00 TO STA 2060+00	1551	3		
CABLE BARRIER LAYOUT STA 2060+00 TO STA 2080+00	1711	2		
CABLE BARRIER LAYOUT STA 2080+00 TO STA 2100+00	1996			
CABLE BARRIER LAYOUT STA 2100+00 TO STA 2120+00	1593	2		
CABLE BARRIER LAYOUT STA 2120+00 TO STA 2140+00	1599	2		
CABLE BARRIER LAYOUT STA 3040+00 TO STA 3060+00	854	1		
TRAFFIC CONTROL PLAN			2	30
TOTALS	12065	14	2	30

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

US 281: CABLE BARRIER

QUANTITY SUMMARY

SHEET 3 OF 3

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	11

Plotted on: 3/19/2024

Design Filename: P:\122\96\02\Tasks\13_US 281 Cable Barrier\Design\Civil\General\1229602_13_RDWY_QTY.dgn

CSJ	TCP PHASE	SPECIFIC TCP PLAN SHEET OR TCP STANDARD SHEET					6185 6002	6185 6005
			FURNISH TMA/TA	RELOCATE/REUSE TMA/TA	TOTAL TMA/TA PER SET UP	DURATION OF TMA/TA SET UP	TMA (STATIONARY)	TMA (MOBILE OPERATION)
		SHEET NUMBER	EA	EA	EA	DAYS PER TMA/TA USE	DAY	DAY
0073-02-088	1		1				7	
0073-03-072	1			1			50	
0073-04-051	1			1			30	
		TOTALS	1	2			87	

DESIGN

JUSTIN W. CLARK, P.E. — 3/19/2024 DATE

APPROVAL

GILMER D. GASTON, P.E. — 3/19/2024 DATE

NOTE.
FURNISH TMA/TA - THE NUMBER OF ATTENUATORS BEING FURNISHED FOR THE SPECIFIC TCP.
RELOCATE/REUSE TMA/TA - THE NUMBER OF ATTENUATORS BEING REUSED FROM A PREVIOUS TCP FOR THE SPECIFIC TCP.
TOTAL TMA/TA PER SET UP = (FURNISH TMA/TA) + (RELOCATE/REUSE TMA/TA)
DURATION OF TMA/TA SET UP - THE NUMBER OF DAYS THE ATTENTUATORS WILL BE USED FOR THE SPECIFIC TCP.
TMA/TA (STATIONARY) = (TOTAL TMA/TA PER SET UP) X (THE DURATION OF TMA/TA SET UP)
TMA/TA (MOBILE OPERATION) = (TOTAL TMA/TA PER SET UP) X (THE DURATION OF TMA/TA SET UP)

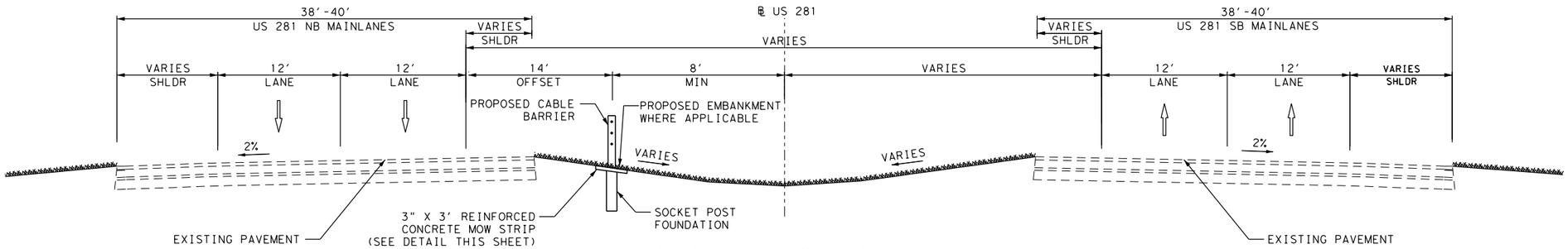
TRUCK MOUNTED ATTENUATOR (TMA) AND TRAILER ATTENUATOR (TA) SUMMARY SHEET

FILE: tma.dgn	DN: TxDOT	CK:		CK:
© TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS 3/2018	0073	02	088,ETC	US 281
	DIST	COUNTY		
	SAT	BEXAR		
	FEDERAL AID PROJECT			SHEET NO.
	SEE TITLE SHEET			12

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0073-02-088 **DISTRICT** San Antonio **COUNTY** Atascosa, Bexar
HIGHWAY US 281

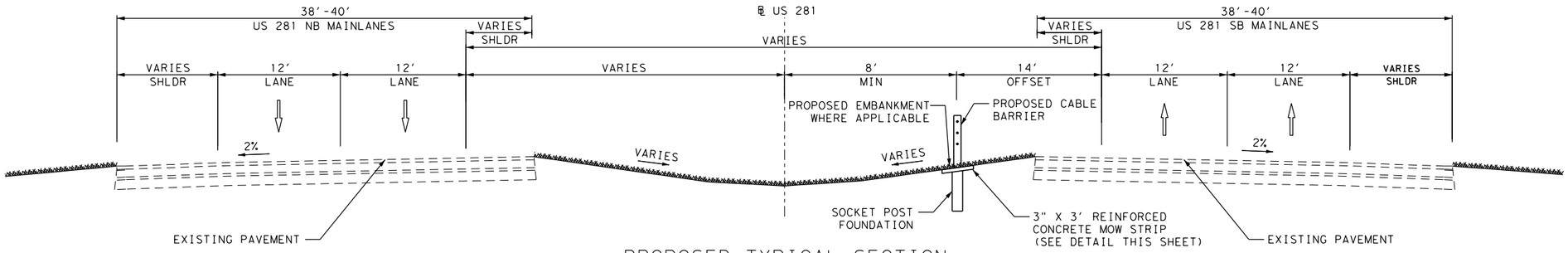
				0073-02-088		0073-03-072		0073-04-051		TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB									
		PROJECT ID		A00203288		A00203289		A00203292			
		COUNTY		Bexar		Atascosa		Atascosa			
		HIGHWAY		US 281		US 281		US 281			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	132-6021	EMBANKMENT (VEHICLE)(ORD COMP)(TY C)	CY	18.000		203.000		85.000		306.000	
	150-6002	BLADING	HR	13.000		175.000		68.000		256.000	
	164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	1,723.000		19,458.000		8,044.000		29,225.000	
	164-6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	1,723.000		19,458.000		8,044.000		29,225.000	
	168-6001	VEGETATIVE WATERING	MG	26.880		303.530		125.490		455.900	
	169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	1,723.000		19,458.000		8,044.000		29,225.000	
	432-6066	RIPRAP (CL A) (MOW STRIP) (3 IN)	CY	72.000		812.000		334.000		1,218.000	
	500-6001	MOBILIZATION	LS	1.000						1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	1.000		3.000		2.000		6.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF			1,448.000		900.000		2,348.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF			1,448.000		900.000		2,348.000	
	506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF			320.000				320.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF			320.000				320.000	
	543-6002	CABLE BARRIER SYSTEM (TL-4)	LF	2,584.000		29,188.000		12,065.000		43,837.000	
	543-6020	CABLE BARRIER TERMINAL SECTION (TL-4)	EA	3.000		51.000		14.000		68.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	2.000		2.000		2.000		6.000	
	6185-6002	TMA (STATIONARY)	DAY	7.000		50.000		30.000		87.000	
	18	LAW ENFORCEMENT: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000						1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000						1.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000						1.000	



PROPOSED TYPICAL SECTION

NTS

STA 1013+67 TO STA 1030+00



PROPOSED TYPICAL SECTION

NTS

STA 1001+00 TO STA 1011+39

DESIGN

JUSTIN W. CLARK, 118715, LICENSED PROFESSIONAL ENGINEER, STATE OF TEXAS

JUSTIN W. CLARK, P.E. — 3/26/2024 DATE

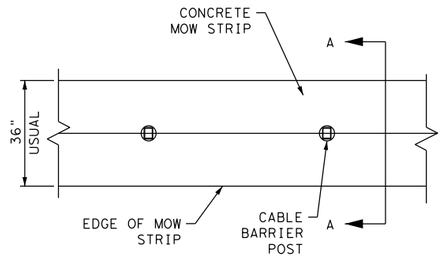
APPROVAL

GILMER D. GASTON, 80472, LICENSED PROFESSIONAL ENGINEER, STATE OF TEXAS

GILMER D. GASTON, P.E. — 3/26/2024 DATE

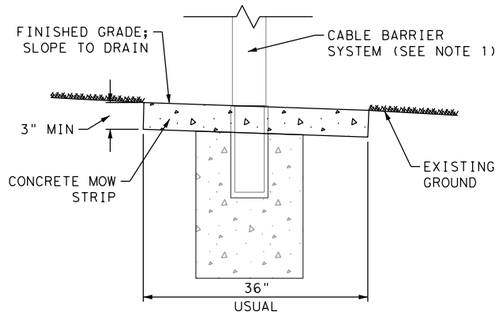
NOTES:

1. FOR ADDITIONAL INFORMATION ON CABLE BARRIER AND FOUNDATION DETAILS, SEE APPLICABLE STANDARDS.
2. MOW STRIPS SHALL BE REINFORCED WITH (WIRE MESH OR SYNTHETIC FIBER), AS SHOWN ON THE PLANS AND WILL BE PAID FOR UNDER THE PERTINENT BID ITEM. REINFORCED CONCRETE SHALL BE PLACED IN ACCORDANCE WITH ITEM 432, "RIPRAP". THE USE OF SYNTHETIC FIBER IN LIEU OF STEEL REINFORCING IS ACCEPTABLE PROVIDED THE FIBER PRODUCER IS ON THE DEPARTMENT MATERIAL PRODUCER LIST (MPL), MAINTAINED BY TxDOT, CONSTRUCTION DIVISION.
3. THE CABLE BARRIER SYSTEM(S) SELECTED FOR EACH PROJECT SHALL BE INSTALLED BASED ON THE STANDARDS, GUIDELINES, AND RECOMMENDATIONS PROVIDED BY THE SELECTED MANUFACTURER(S) OF EACH INDIVIDUAL SYSTEM.
4. USE CLASS "A" CONCRETE IN ACCORDANCE WITH ITEM 421.



CABLE BARRIER MOW STRIP DETAIL

NTS



CABLE BARRIER MOW STRIP SECTION A-A

NTS

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

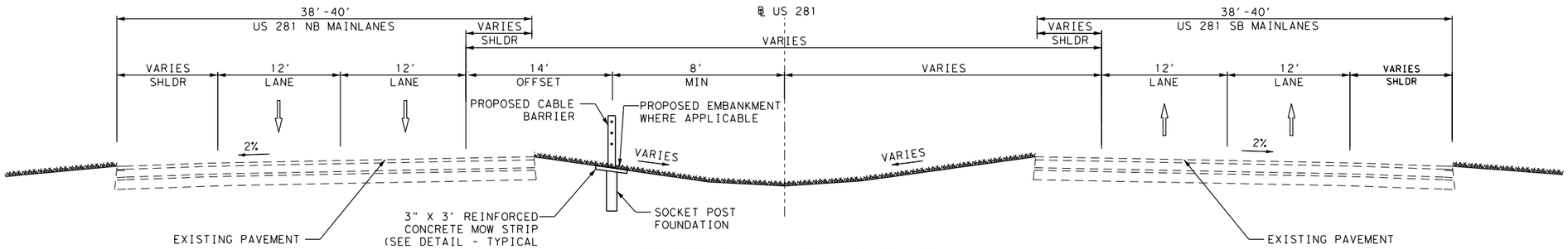
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

US 281: CABLE BARRIER

TYPICAL SECTIONS

SHEET 1 OF 3

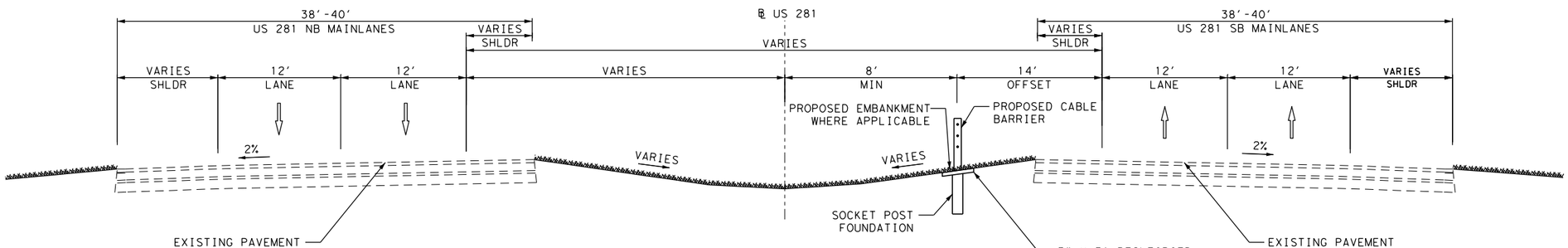
DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	14



PROPOSED TYPICAL SECTION

NTS

STA 1066+54 TO STA 1083+12
STA 1099+56 TO STA 1115+52
STA 1117+19 TO STA 1130+48
STA 1134+60 TO STA 1144+09
STA 1162+12 TO STA 1170+38
STA 1172+81 TO STA 1190+33
STA 1192+25 TO STA 1208+91
STA 1230+95 TO STA 1247+71
STA 1249+73 TO STA 1256+01
STA 1258+98 TO STA 1269+33
STA 1305+23 TO STA 1313+32
STA 1328+70 TO STA 1335+56
STA 1371+69 TO STA 1384+25
STA 1386+24 TO STA 1401+32
STA 1406+28 TO STA 1417+26
STA 1419+94 TO STA 1435+78
STA 1480+17 TO STA 1488+25



PROPOSED TYPICAL SECTION

NTS

STA 1040+05 TO STA 1048+64
STA 1052+77 TO STA 1064+13
STA 1145+85 TO STA 1159+97
STA 1210+83 TO STA 1228+67
STA 1315+45 TO STA 1326+86
STA 1356+75 TO STA 1369+20
STA 1438+78 TO STA 1449+99
STA 1470+86 TO STA 1477+95

DESIGN

STATE OF TEXAS — JUSTIN W. CLARK — 118715 — LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 3/26/2024 DATE

APPROVAL

STATE OF TEXAS — GILMER D. GASTON — 80472 — LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 3/26/2024 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

US 281: CABLE BARRIER

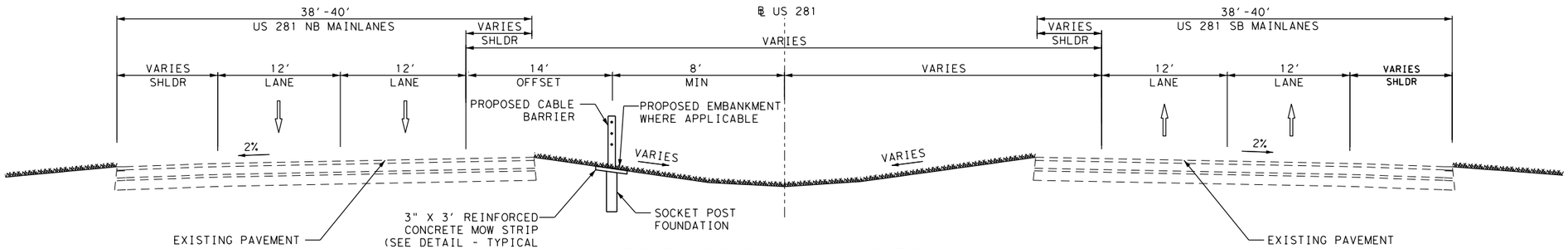
TYPICAL SECTIONS

SHEET 2 OF 3

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	15

Plotted on: 3/26/2024

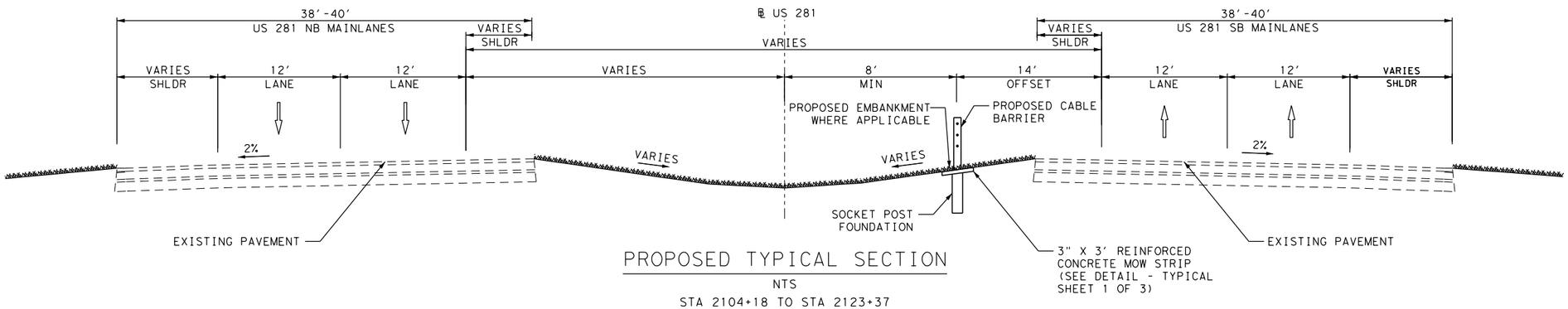
Design Filename: P:\122\96\02\Tasks\13_US 281 Cable Barrier\Design\Civil\General\122602_13_TYP.dgn



PROPOSED TYPICAL SECTION

NTS

STA 2006+84 TO STA 2019+74
STA 2022+45 TO STA 2038+26
STA 2040+95 TO STA 2050+19
STA 2052+86 TO STA 2070+18
STA 2072+49 TO STA 2100+69
STA 2126+80 TO STA 2148+84



PROPOSED TYPICAL SECTION

NTS

STA 2104+18 TO STA 2123+37

DESIGN

JUSTIN W. CLARK, P.E. — 3/26/2024 DATE

APPROVAL

GILMER D. GASTON, P.E. — 3/26/2024 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

US 281: CABLE BARRIER

TYPICAL SECTIONS

SHEET 3 OF 3

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	16

Plotted on: 3/26/2024

Design Filename: P:\122\96\02\Tasks\13_US 281 Cable Barrier\Design\Civil\General\1229602_13_TYP.dgn

THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE REQUIREMENTS OF ITEM 7, "LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC", OF THE STANDARD SPECIFICATIONS. IN ADDITION TO THESE REQUIREMENTS, THE FOLLOWING PROVISIONS SHALL ALSO GOVERN ON THIS CONTRACT:

GENERAL

(1) TRAFFIC MUST BE HANDLED THROUGHOUT THE PROJECT DURING CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING A SAFE AND COMFORTABLE PASSAGE FOR VEHICULAR AND PEDESTRIAN TRAFFIC WITH MINIMAL INCONVENIENCE TO THE PUBLIC, AS SHOWN IN THE PLANS OR AS DIRECTED/APPROVED BY THE ENGINEER.
(2) THE CONTRACTOR MAY PROPOSE/RECOMMEND MODIFICATIONS TO THE SEQUENCE OF WORK FOR CONSIDERATION BY THE ENGINEER. ANY MAJOR RECOMMENDED MODIFICATION BY THE CONTRACTOR SHALL INCLUDE ANY CHANGES TO THE VARIOUS BID ITEMS, IMPACT TO TRAFFIC, EFFECT OF OVERALL PROJECT IN TIME AND COST, ETC. IF THIS PROPOSAL IS IMPLEMENTED, THE CONTRACTOR WILL BE RESPONSIBLE FOR DEVELOPING DETAILED PLAN SHEETS TO BE SEALED BY
(3) A LICENSED PROFESSIONAL ENGINEER FOR INCLUSION WITH THE CHANGE ORDER. THE CONTRACTOR CANNOT PROCEED WITH ANY CONSTRUCTION OPERATIONS BASED ON A REVISED PHASE/SEQUENCE UNTIL WRITTEN APPROVAL IS OBTAINED FROM THE ENGINEER. IF AT ANY TIME DURING CONSTRUCTION THE CONTRACTOR'S PROPOSED PLAN OF OPERATION FOR HANDLING TRAFFIC DOES NCT PROVIDE FOR SAFE AND COMFORTABLE MOVEMENT, THE CONTRACTOR WILL IMMEDIATELY CHANGE THEIR OPERATION TO CORRECT THE UNSATISFACTORY CONDITION.
(4) DO NOT STORE ANY CONSTRUCTION MATERIAL OR EQUIPMENT AT ANY LOCATION THAT WILL CONSTITUTE HAZARD AND WILL ENDANGER TRAFFIC. DO NOT PLACE SPOILS, EQUIPMENT, ETC. WITHIN THE CENTER MEDIAN. POSITIVE FLOW MUST BE MAINTAINED AT ALL TIMES.
(5) TEMPORARY DRAINAGE IS THE RESPONSIBILITY OF THE CONTRACTOR.
(6) COORDINATE WITH ADJACENT PROJECTS.

TRAFFIC CONTROL PLAN SEQUENCE OF WORK

(1) THIS PROJECT WILL BE CONSTRUCTED IN ONE PHASE (2 STEPS). BEFORE THE COMMENCEMENT OF EACH PHASE, INSTALL ADVANCE WARNING SIGNS, TEMPORARY SIGNS AND BARRICADES AS SHOWN ON THE PLANS AND/OR AS DIRECTED/APPROVED BY THE ENGINEER. DAILY LANE CLOSURES WILL BE USED IN ACCORDANCE WITH STATE TCP STANDARDS. DROP OFF CONDITIONS OF GREATER THAN 2" MUST HAVE A 3:1 SLOPE AT THE END OF EACH DAY, AS WELL AS THROUGHOUT THE PROJECT WHERE ACCESS TO ADJACENT PROPERTIES IS ALLOWED TO DRIVEWAYS AND SIDE STREETS. PLACE PCMS 10 DAYS IN ADVANCE OF STARTING WORK AT EACH LOCATION.
(2) PREPARING ROW / REMOVAL OF EXISTING ITEMS TO BE DONE ONLY IN AREAS WHERE WORK IS OCCURRING, AS PER THE PHASES NOTED BELOW.
(3) THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE REQUIREMENTS OF ITEM 7, "LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC" AND ITEM 502, "BARRICADES, SIGNS, AND TRAFFIC HANDLING", OF THE STANADARD SPECIFICATIONS, AND TO THE GENERAL NOTES
(4) A SEGMENT MUST BE COMPLETED PRIOR TO BEGINNING WORK ON ANOTHER SEGMENT. PRIOR TO BEGINNING WORK ON ANOTHER SEGMENT, THE TRAFFIC MUST BE BROUGHT TO FULL OPERATION. ALL BID ITEM WORK FOR EACH SEGMENT MUST BE COMPLETED BEFORE MOVING TO THE SUBSEQUEST LOCATION. THIS INCLUDES COMPLETING VEGETATION ITEMS, PUNCHLIST AND CLEAN-UP ITEMS.
(5) A BRIEF DESCRIPTION OF THESE PHASES ARE AS FOLLOWS:

PHASE 1:

(1) MOBILIZATION.
(2) INSTALL ADVANCE WARNING SIGNS, TEMPORARY SIGNS, CONSTRUCTION SIGNS, BARRICADES, CHANNELIZING DEVICES AS SHOWN ON THE TYPICAL TRAFFIC CONTROL PLAN.
(3) CLOSE THE INSIDE LANE IN ONE DIRECTION (NEAR THE PROPOSED CABLE BARRIER) AND THE SHOULDER IN THE OTHER DIRECTION AS SHOWN IN THE TCP TYPICAL SECTIONS.
(4) INSTALL MOW STRIP AND CABLE BARRIER POST FOUNDATIONS.
(5) OPEN ALL LANES AND SHOULDERS DURING NON-WORKING HOURS.

PHASE 1 STEP 2:

(1) INSTALL ADVANCE WARNING SIGNS, TEMPORARY SIGNS, CONSTRUCTION SIGNS, BARRICADES, CHANNELIZING DEVICES AS SHOWN ON THE TYPICAL TRAFFIC CONTROL PLAN.
(2) CLOSE THE INSIDE SHOULDERS IN BOTH DIRECTIONS AS SHOWN IN THE TCP TYPICAL SECTIONS.
(3) INSTALL CABLE BARRIER POSTS AND CABLES.
(4) OPEN ALL LANES AND SHOULDERS DURING NON-WORKING HOURS.
(5) PERFORM FINAL CLEANUP.

SAFETY:

THE CONTRACTOR WILL PROVIDE, CONSTRUCT AND MAINTAIN BARRICADES AND SIGNS IN ACCORDANCE WITH STATE STANDARDS BC (1-2)-21. ANY SIGNS REQUIRED THAT ARE NOT DETAILED IN THE STANDARD SHEETS SHALL BE IN CONFORMANCE WITH THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS" AND THE "STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS." BARRICADES AND WARNING SIGNS SHALL BE PLACED AS INDICATED ON THE PLANS. THIS SHALL BE CONSIDERED THE MINIMUM REQUIRED TO PROVIDE FOR THE SAFETY OF TRAFFIC DURING CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN OTHER BARRICADES AND SIGNS DEEMED NECESSARY BY THE ENGINEER OR AS DIRECTED BY FIELD CONDITIONS, TO PROVIDE FOR THE PASSAGE OF TRAFFIC IN SAFETY AT ALL TIMES. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN FLAGGERS AS DIRECTED/APPROVED BY THE ENGINEER, AT SUCH POINTS, AND FOR SUCH PERIODS OF TIME AS MAY BE REQUIRED, TO PROVIDE FOR THE SAFETY OF THE TRAVELING PUBLIC AND THE CONTRACTOR'S PERSONNEL. THE CONTRACTOR SHALL KEEP THE ROADWAY CLEAN AND FREE OF DIRT OR OTHER MATERIALS DURING HAULING OPERATIONS. IF THE CONTRACTOR DOES NOT MAINTAIN A CLEAN ROADWAY, THEY SHALL CEASE ALL CONSTRUCTION OPERATIONS, WHEN DIRECTED BY THE ENGINEER, TO CLEAN THE ROADWAY TO THE SATISFACTION OF THE ENGINEER.

HAULING EQUIPMENT:

THE USE OF RUBBER-TIRED EQUIPMENT WILL BE REQUIRED FOR MOVING DIRT OR OTHER MATERIALS ALONG OR ACROSS PAVEMENTED SURFACES. WHERE THE CONTRACTOR DESIRES TO MOVE ANY EQUIPMENT NOT LICENSED FOR OPERATION ON PUBLIC HIGHWAYS, ON OR ACROSS PAVEMENT. THEY SHALL PROTECT THE PAVEMENT FROM DAMAGE AS DIRECTED/APPROVED BY THE ENGINEER. THROUGHOUT CONSTRUCTION OPERATIONS, THE CONTRACTOR WILL BE REQUIRED TO CONDUCT THEIR HAULING OPERATIONS IN A MANNER SUCH THAT VEHICLES WILL NOT HAUL OVER PREVIOUSLY RECOMPACTED SUBGRADE OR COMPACTED BASE MATERIAL, EXCEPT IN SHORT SECTIONS FOR DUMPING MANIPULATIONS.

FINAL CLEAN UP:

UPON COMPLETION OF THE WORK AND BEFORE FINAL ACCEPTANCE AND FINAL PAYMENT IS MADE, THE CONTRACTOR SHALL CLEAR AND REMOVE FROM THE SITE ALL SURPLUS AND DISCARDED MATERIALS AND DEBRIS OF EVERY KIND AND LEAVE THE ENTIRE PROJECT IN SMOOTH, NEAT AND SIGHTLY CONDITION.

PAYMENT:

ALL BARRICADES, SIGNS, AND FLAGGERS SHALL BE SUBSIDIARY TO ITEM 502 BARRICADES, SIGNS AND TRAFFIC HANDLING. ALL EROSION AND SEDIMENT CONTROL DEVICES WILL BE PAID FOR UNDER ITEM 506 TEMPORARY EROSION, SEDIMENTATION, AND ENVIRONMENTAL CONTROLS. ALL WORK ZONE PAVEMENT MARKINGS WILL BE PAID FOR UNDER ITEM 662 WORK ZONE PAVEMENT MARKINGS. ALL OTHER WORK AND MATERIALS SHALL BE SUBSIDIARY TO THE VARIOUS BID ITEMS UNLESS OTHERWISE INDICATED IN THE PLANS.

DESIGN

STATE OF TEXAS
JUSTIN W. CLARK
118715
LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 3/19/2024 DATE

APPROVAL

STATE OF TEXAS
GILMER D. GASTON
80472
LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 3/19/2024 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

US 281: CABLE BARRIER

TCP NARRATIVE

SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	17

Plotted on: 3/19/2024
Design Filename: P:\122\96\02\Tasks\13_US 281 Cable Barrier\Design\Civil\TCP\1229602_13_TCP_NARRATIVE.dgn

PROJECT LIMIT SIGNING														
LOCATION	ROAD WORK AHEAD CW20-1D (36"x36")	END WORK ZONE G20-2bT (36"x18")	END ROAD WORK G2-2 (36"x18")	NAME ADDRESS CITY STATE CONTRACTOR G20-6T (48"x30")	BEGIN WORK ZONE G20-9TP (24"x24")	Give Us A BRAKE CW21-1T (36"x36")	OBEY WARNING SIGNS STATE LAW R20-3T (48"x42")	WHEN WORKERS ARE PRESENT R20-5aTP (24"x12")	TRAFFIC FINES DOUBLE R20-5T (24"x30")	ONE LANE ROAD 500 FT CW20-4C (36"x36")	NARROW LANES AHEAD CW20-8T (36"x36")	STAY ALERT TALK OR TEXT LATER G20-10T (60"x48")	DO NOT PASS R4-1 (24"x30")	NO CENTER LINE CW8-12 (36"x36")
BEGINNING OF THE PROJECT	X			X	X		X	X	X	X		X		
AND ENTERING SIDE STREETS														
LEAVING PROJECT LIMITS AND		X	X											
EXITING SIDE STREETS														
USED THROUGHOUT PROJECT	X					X					X		X	X
AS DIRECTED BY THE ENGINEER														

PROJECT LIMIT SIGNING														
LOCATION	ROAD NARROWS CW5-1 (36"x36")	SPEED LIMIT 18 R2-1 (24"x30")	XX MPH CW13-1P (24"x24")	ROAD WORK ← NEXT X MILES G20-1bTL (72"x24")	ROAD WORK NEXT X MILES → G20-1bTR (72"x24")	ROAD CLOSED R11-2 (48"x30")	P.C.M.B.	ARROW BOARD	TY 3 BARRICADE	VERTICAL PANEL	PLASTIC BARRELS	LEFT SHOULDER CLOSED CW21-5aL (48"X48")	1/2 MILE CW16-3aP (30"X12")	LEFT LANE CLOSED CW20-5TL (48"X48")
BEGINNING OF THE PROJECT			X	X	X									
AND ENTERING SIDE STREETS														
LEAVING PROJECT LIMITS AND														
EXITING SIDE STREETS														
USED THROUGHOUT PROJECT	X	X	X			X	X	X	X	X	X	X	X	X
AS DIRECTED BY THE ENGINEER													X	X

DESIGN

STATE OF TEXAS
JUSTIN W. CLARK
118715
LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 3/19/2024 DATE

APPROVAL

STATE OF TEXAS
GILMER D. GASTON
80472
LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 3/19/2024 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

US 281: CABLE BARRIER

SCHEDULE OF BARRICADES AND DEVICES

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	18

Plotted on: 3/19/2024

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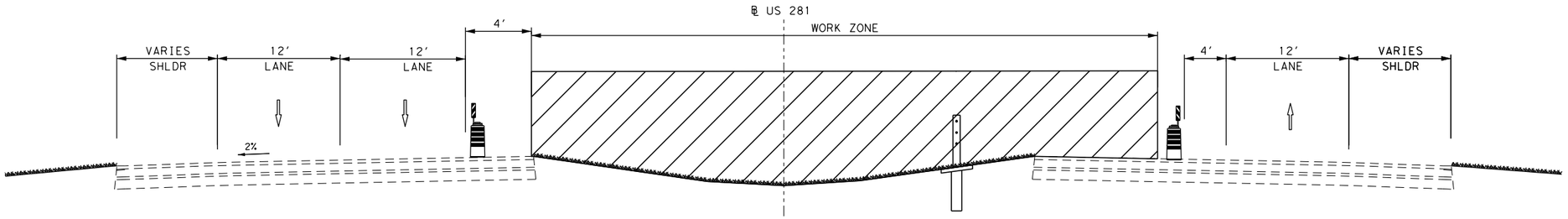
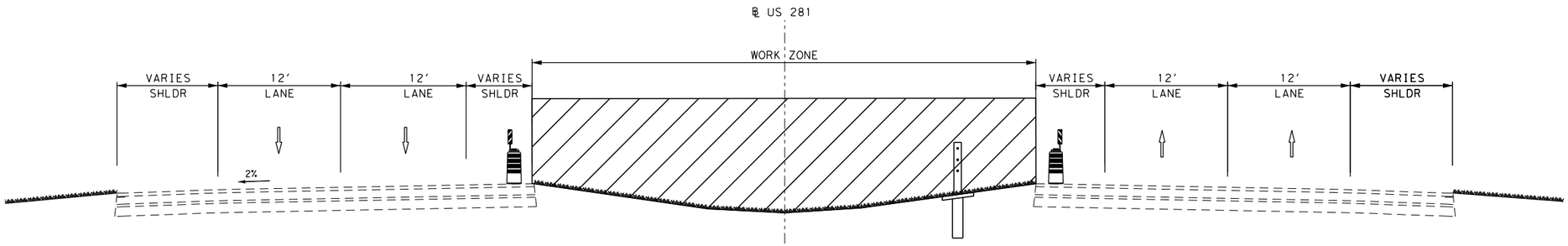


TCP TYPICAL SECTIONS
PHASE 1 - INSTALLING MOW STRIP, CABLE BARRIER POST FOUNDATIONS



TCP TYPICAL SECTIONS
PHASE 1 - STEP 2 - INSTALLING CABLE BARRIER POSTS AND TENSIONING THE CABLE

DESIGN

STATE OF TEXAS
JUSTIN W. CLARK
118715
LICENSED
PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 3/19/2024 DATE

APPROVAL

STATE OF TEXAS
GILMER D. GASTON
80472
LICENSED
PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 3/19/2024 DATE

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TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

US 281: CABLE BARRIER

TCP TYPICAL SECTIONS

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	19

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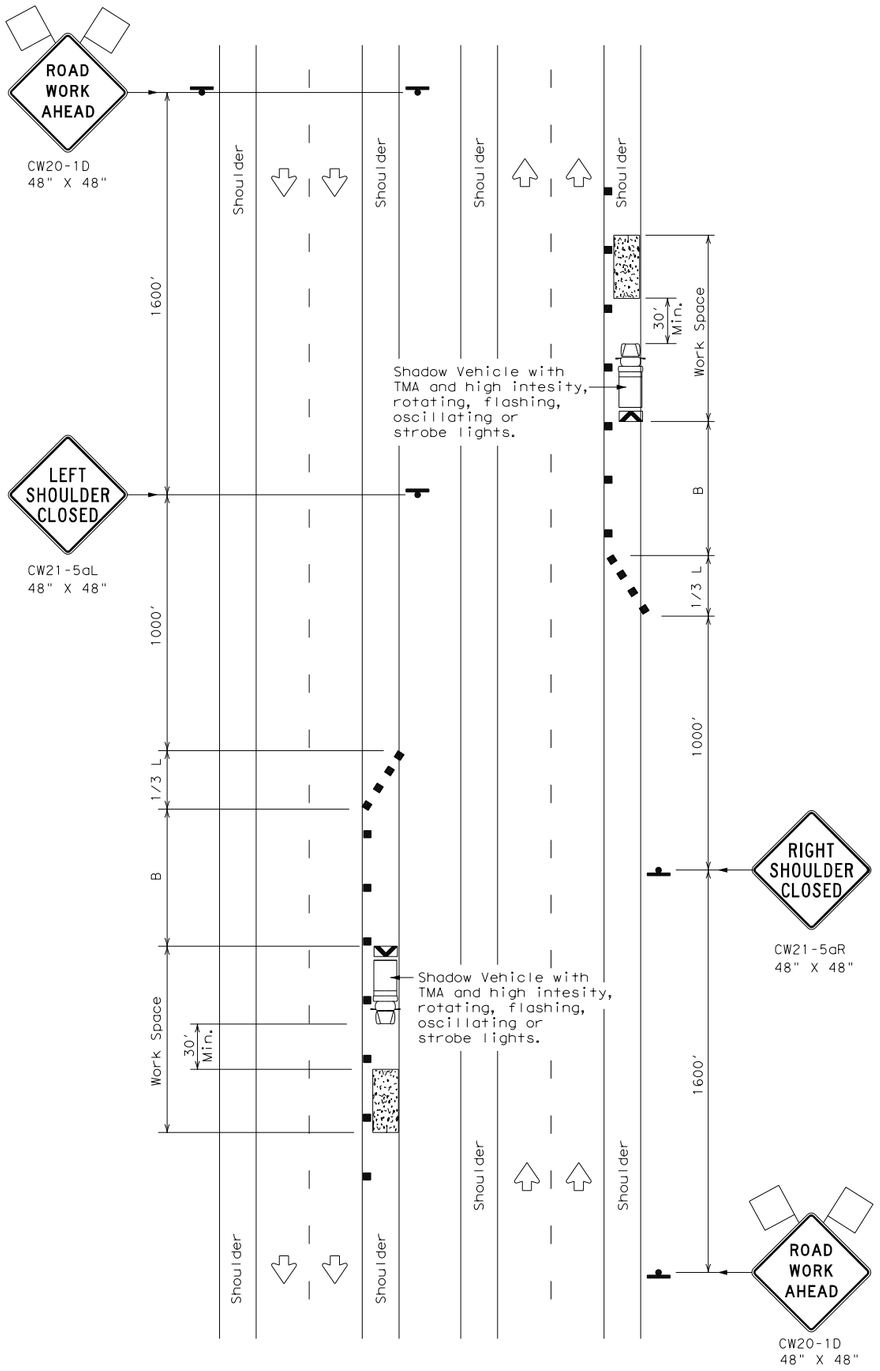
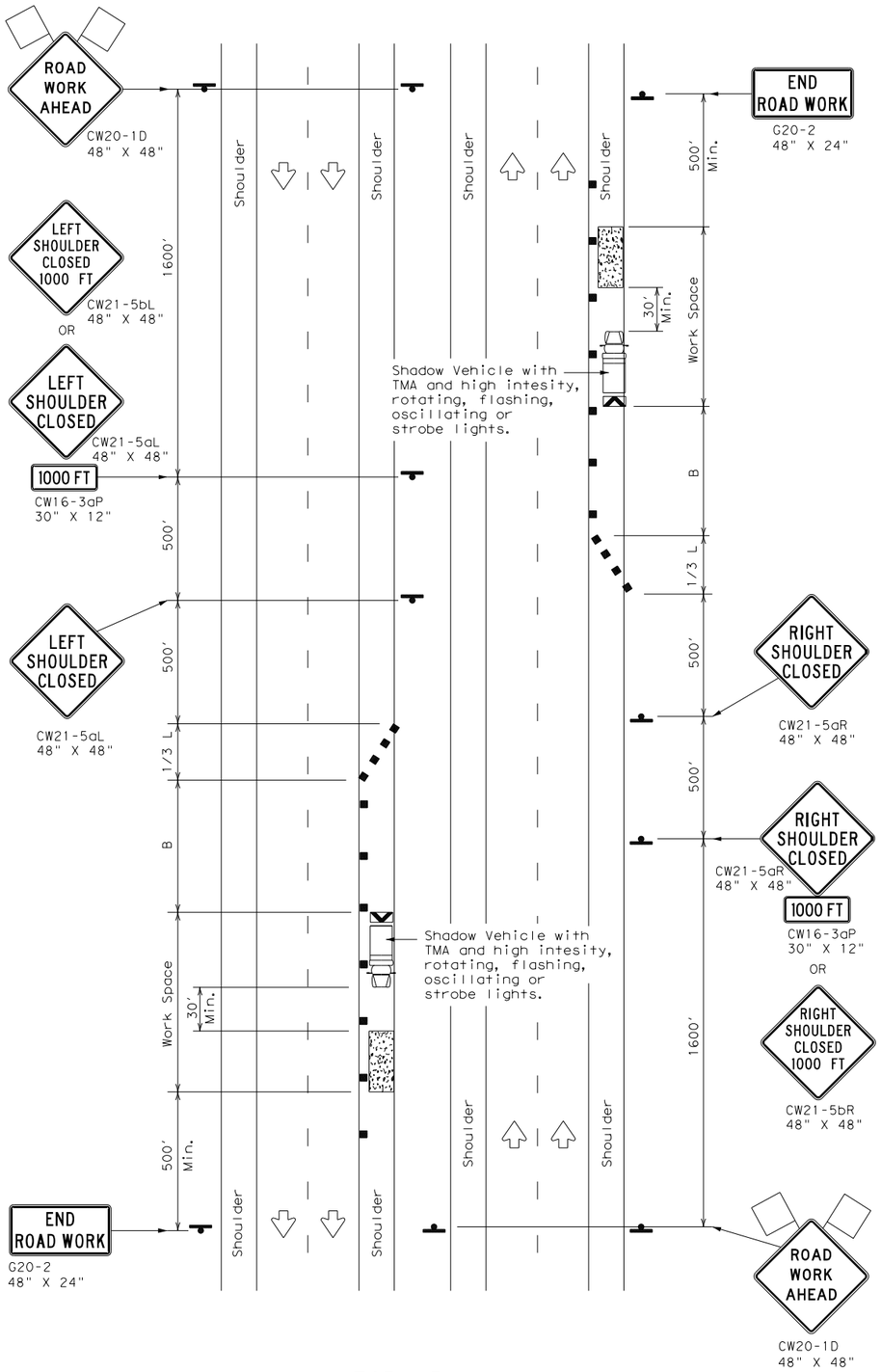


TCP (5-1a)

WORK AREA ON SHOULDER



TCP (5-1b)

WORK AREA ON SHOULDER

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	90'
35		205'	225'	245'	35'	70'	120'
40		265'	295'	320'	40'	80'	155'
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

* Conventional Roads Only
** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	TCP(5-1a)	TCP(5-1b)	TCP(5-1b)	

GENERAL NOTES

1. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30' to 100' in advance of the area of crew exposure without adversely effecting the performance or quality of the work. Type 3 barricades or drums may be substituted when workers on foot are no longer present when approved by the Engineer.
2. 28" tall or taller one-piece cones will be allowed only for Short Duration or Short Term stationary operations when workers are present to maintain the devices upright and in proper location. Intermediate Term stationary work areas should use Drums, Vertical Panels or 42" tall two-piece cones.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN SHOULDER WORK FOR FREEWAYS / EXPRESSWAYS

TCP(5-1)-18

FILE: tcp5-1-18.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS	0073	02	088,ETC	US 281
2-18	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		20

DATE: 3/19/2024 9:37:05 PM
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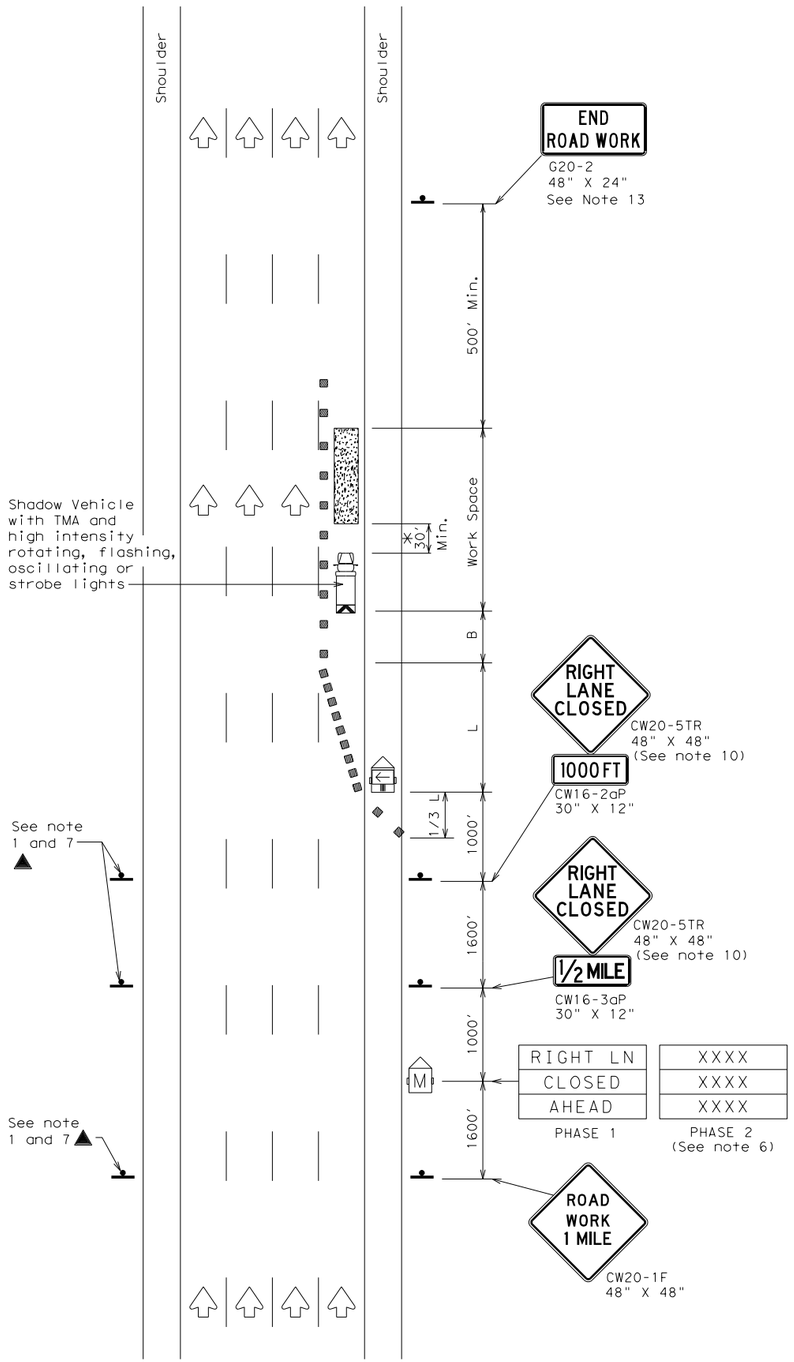
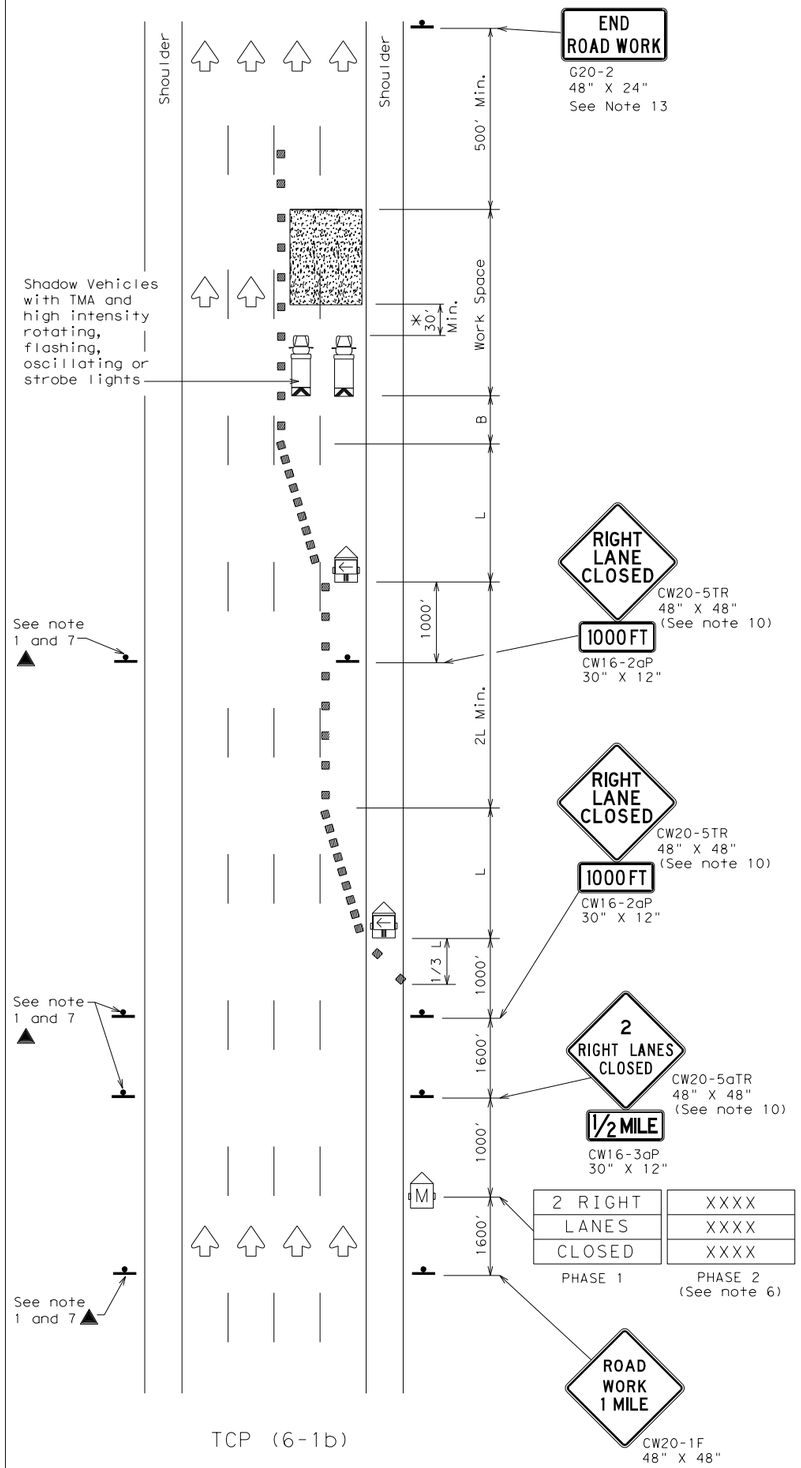


TCP (6-1a)

TYPICAL FREEWAY ONE LANE CLOSURE



TCP (6-1b)

TYPICAL FREEWAY TWO LANE CLOSURE

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed	Formula	Minimum Desirable Taper Lengths "L" **			Suggested Maximum Spacing of Channelizing Devices		Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓	✓	

GENERAL NOTES

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. Drums or 42"cones are the typical channelizing devices. For Intermediate Term Stationary work, drums shall be used on tapers with drums or 42" cones used on tangent sections. Other channelizing devices may be used as directed by the Engineer.
3. All construction signs and barricades placed during any phase of work shall remain in place until removal is approved by the Engineer.
4. The Engineer may direct the Contractor to furnish additional signs and barricades as required to maintain traffic flow, detours and motorist safety during construction.
5. Static message boards or changeable message signs stating the date and duration of ramp or freeway lane closures shall be placed a minimum of seven (7) calendar days in advance of the actual closure.
6. Phase 2 of the PCMS message should include appropriate information formatted as shown on BC(6), such as "MERGE LEFT," recommended advisory speed, delay information, or other specific warnings.
7. Duplicate construction warning signs should be erected on the medians side of freeways where median width will permit and traffic volume justifies the signing.
8. The number of closed lanes may be increased provided the spacing of traffic control devices, taper lengths and tangent lengths meet the requirements of the TMUTCD.
9. Warning signs for intermediate term stationary work should be mounted at 7' to the bottom of the sign.
10. Warning signs shown shall be appropriately altered for left lane closures. When signs are mounted at 1' height for short term stationary or short duration work, sign versions shown in the SHSD for Texas with distances on the sign face rather than mounted on a plaque below the sign may be used.
11. When possible, PCMS units should be located in advance of the last available exit ramp prior to the lane closure to allow motorists an alternate route. They may also be relocated to improve advance warning in case of unanticipated queuing or congestion.
12. For Intermediate Term Stationary work at night, floodlights should be used to illuminate the work area and equipment crossings. Floodlights shall not produce a disabling glare condition for road users or workers.
13. The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

* A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN FREEWAY LANE CLOSURES

TCP(6-1)-12

FILE: tcp6-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-12	0073	02	088,ETC	US 281
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		21

DATE: 3/19/2024 9:37:06 PM
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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

1. The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).

2. The development and design of the Traffic Control Plan (TCP)is the responsibility of the Engineer.

3. The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.

4. The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.

5. Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets," the TxDOT "Roadway Design Manual" or engineering judgment.

6. When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.

7. The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.

8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.

9. The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.

10. Where highway construction or maintenance work is being undertaken, other than mobile operations as defined by the Texas Manual on Uniform Traffic Control Devices, CSJ limit signs are required. CSJ limit signs are shown on BC(2). The OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits. For mobile operations, CSJ limit signs are not required.

11. Traffic control devices should be in place only while work is actually in progress or a definite need exists.

12. The Engineer has the final decision on the location of all traffic control devices.

13. Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

WORKER SAFETY NOTES:

1. Workers on foot who are exposed to traffic or to construction equipment within the right-of-way shall wear high-visibility safety apparel meeting the requirements of ISEA "American National Standard for High-Visibility Apparel," or equivalent revisions, and labeled as ANSI 107-2004 standard performance for Class 2 or 3 risk exposure. Class 3 garments should be considered for high traffic volume work areas or night time work.

2. Except in emergency situations, flagger stations shall be illuminated when flagging is used at night.

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

1. Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources.

2. Work zone traffic control devices shall be compliant with the Manual for Assessing safety Hardware (MASH).

THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT http://www.txdot.gov
COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICES LIST (CWZTCD)
DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS)
MATERIAL PRODUCER LIST (MPL)
ROADWAY DESIGN MANUAL - SEE "MANUALS (ONLINE MANUALS)"
STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS (SHSD)
TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD)
TRAFFIC ENGINEERING STANDARD SHEETS

SHEET 1 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

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REVISIONS 4-03 7-13 9-07 8-14 5-10 5-21	0073	02	088,ETC	US 281
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	SAT	BEXAR		22

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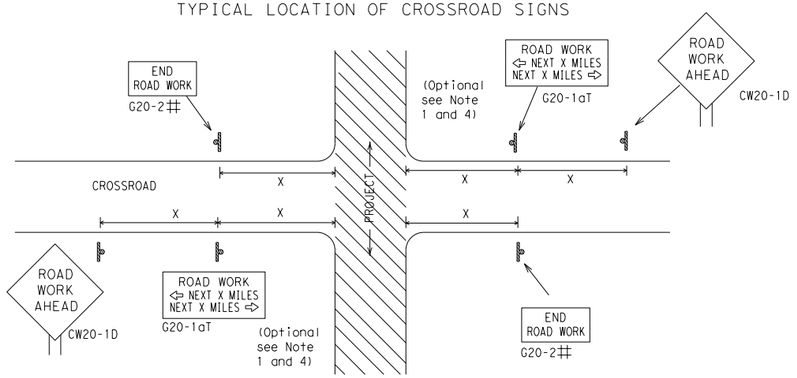
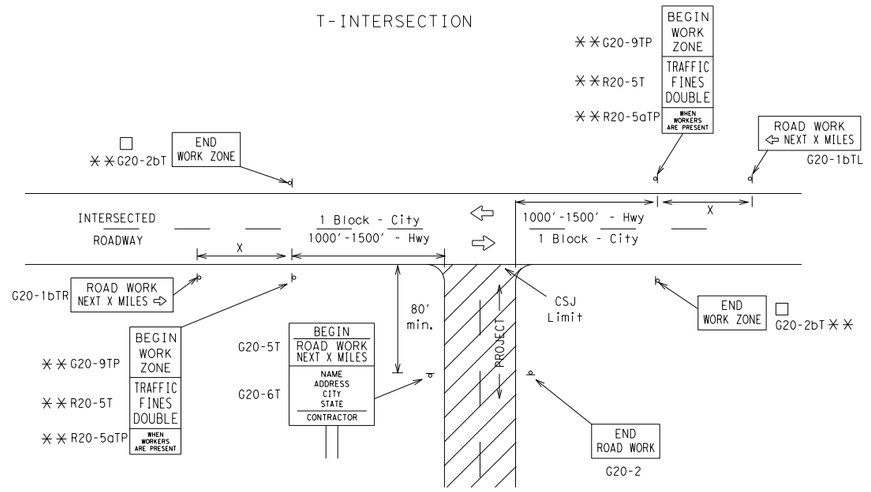
TYPICAL LOCATION OF CROSSROAD SIGNS



May be mounted on back of "ROAD WORK AHEAD"(CW20-1D) sign with approval of Engineer. (See note 2 below)

1. The typical minimum signing on a crossroad approach should be a "ROAD WORK AHEAD" (CW20-1D)sign and a (G20-2) "END ROAD WORK" sign, unless noted otherwise in plans.
2. The Engineer may use the reduced size 36" x 36" ROAD WORK AHEAD (CW20-1D) sign mounted back to back with the reduced size 36" x 18" "END ROAD WORK"(G20-2) sign on low volume crossroads (see Note 4 under "Typical Construction Warning Sign Size and Spacing"). See the "Standard Highway Sign Designs for Texas" manual for sign details. The Engineer may omit the advance warning signs on low volume crossroads. The Engineer will determine whether a road is low volume as per TMUTCD Part 5. This information shall be shown in the plans.
3. Based on existing field conditions, the Engineer/Inspector may require additional signs such as FLAGGER AHEAD, LOOSE GRAVEL, or other appropriate signs. When additional signs are required, these signs will be considered part of the minimum requirements. The Engineer/Inspector will determine the proper location and spacing of any sign not shown on the BC sheets, Traffic Control Plan sheets or the Work Zone Standard Sheets.
4. The "ROAD WORK NEXT X MILES"(G20-1aT)sign shall be required at high volume crossroads to advise motorists of the length of construction in either direction from the intersection. The Engineer will determine whether a roadway is considered high volume.
5. Additional traffic control devices may be shown elsewhere in the plans for higher volume crossroads.
6. When work occurs in the intersection area, appropriate traffic control devices, as shown elsewhere in the plans or as determined by the Engineer/Inspector, shall be in place.

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

1. The Engineer will determine the types and location of any additional traffic control devices, such as a flagger and accompanying signs, or other signs, that should be used when work is being performed at or near an intersection.
2. If construction closes the road at a T-intersection, the Contractor shall place the "CONTRACTOR NAME"(G20-6T) sign behind the Type 3 Barricades for the road closure (see BC(10) also). The "ROAD WORK NEXT X MILES" left arrow(G20-1bTL) and "ROAD WORK NEXT X MILES" right arrow (G20-1bTR)" signs shall be replaced by the detour signing called for in the plans.

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING[1,5,6]

SIZE

Sign Number or Series	Conventional Road	Expressway/ Freeway
CW20[4] CW21 CW22 CW23 CW25	48" x 48"	48" x 48"
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"

SPACING

Posted Speed	Sign △ Spacing "X"
MPH	Feet (Apprx.)
30	120
35	160
40	240
45	320
50	400
55	500[2]
60	600[2]
65	700[2]
70	800[2]
75	900[2]
80	1000[2]
✳	✳[3]

✳ For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

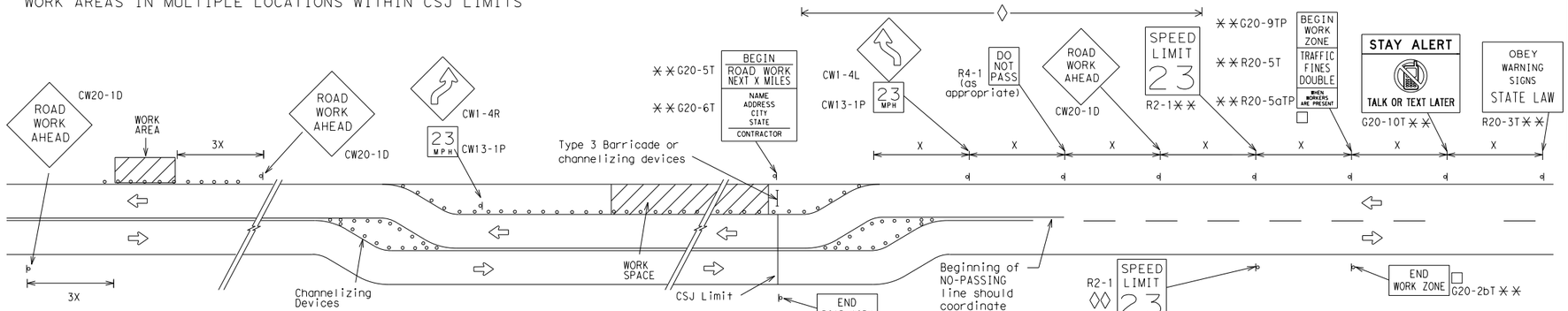
△ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

GENERAL NOTES

1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may be used on low volume crossroads at the discretion of the Engineer as per TMUTCD Part 5. See Note 2 under "Typical Location of Crossroad Signs".
5. Only diamond shaped warning sign sizes are indicated.
6. See sign size listing in "TMUTCD", Sign Appendix or the "Standard Highway Sign Designs for Texas" manual for complete list of available sign design sizes.

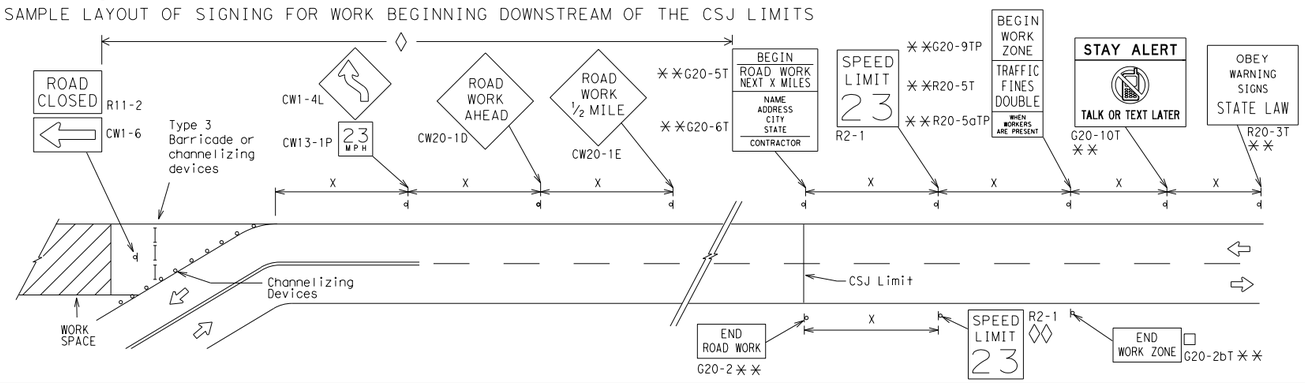
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD"(CW20-1D)signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing of signs and channelizing devices.

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING DOWNSTREAM OF THE CSJ LIMITS



NOTES

The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and "BEGIN ROAD WORK NEXT X MILES"(G20-5T)sign for each specific project. This distance shall replace the "X" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.

□ The "BEGIN WORK ZONE"(G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.

✳✳ CSJ limit signing is required for highway construction and maintenance work, with the exception of mobile operations.

◇ Area for placement of "ROAD WORK AHEAD" (CW20-1D)sign and other signs or devices as called for on the Traffic Control Plan.

◇◇ Contractor will install a regulatory speed limit sign at the end of the work zone.

LEGEND	
⊢⊣	Type 3 Barricade
○ ○ ○	Channelizing Devices
▬	Sign
X	See Typical Construction Warning Sign Size and Spacing chart or the TMUTCD for sign spacing requirements.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

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7-13 5-21	SAT	BEXAR		23

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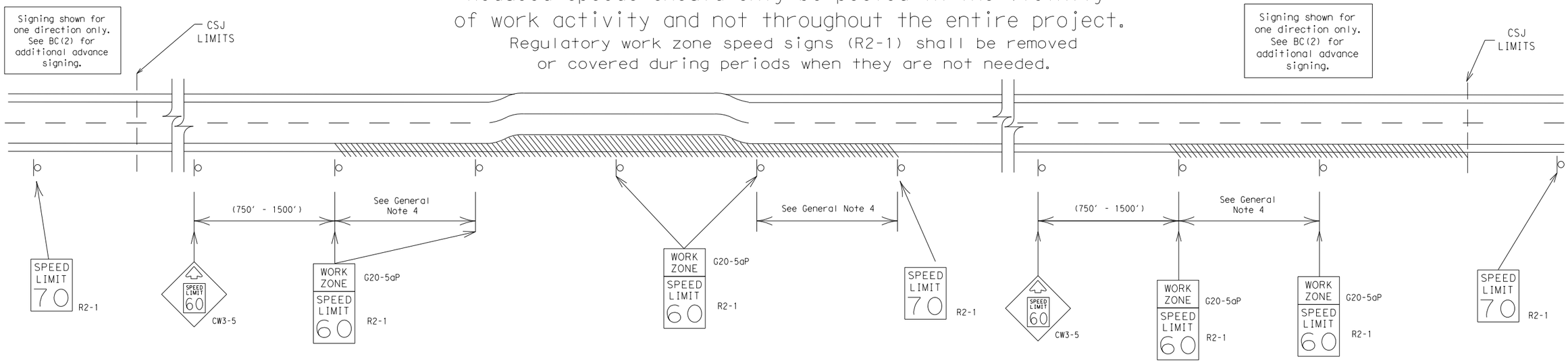
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

Work zone speed limits shall be regulatory, established in accordance with the "Procedures for Establishing Speed Zones," and approved by the Texas Transportation Commission, or by City Ordinance when within Incorporated City Limits.

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project.

Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit should be included on the design of the traffic control plans when restricted geometrics with a lower design speed are present in the work zone and modification of the geometrics to a higher design speed is not feasible.

Long/Intermediate Term Work Zone Speed Limit signs, when approved as described above, should be posted and visible to the motorist when work activity is present. Work activity may also be defined as a change in the roadway that requires a reduced speed for motorists to safely negotiate the work area, including:

a) rough road or damaged pavement surface
b) substantial alteration of roadway geometrics (diversions)
c) construction detours
d) grade
e) width
f) other conditions readily apparent to the driver

As long as any of these conditions exist, the work zone speed limit signs should remain in place.

SHORT TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit may be included on the design of the traffic control plans when workers or equipment are not behind concrete barrier, when work activity is within 10 feet of the traveled way or actually in the traveled way.

Short Term Work Zone Speed Limit signs should be posted and visible to the motorists only when work activity is present. When work activity is not present, signs shall be removed or covered.
(See Removing or Covering on BC(4)).

GENERAL NOTES

1. Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
2. Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
3. Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
4. Frequency of work zone speed limit signs should be:
   40 mph and greater 0.2 to 2 miles
   35 mph and less 0.2 to 1 mile
5. Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
6. Fabrication, erection and maintenance of the"ADVANCE SPEED LIMIT"(CW3-5)sign, "WORK ZONE"(G20-5aP) plaque and the "SPEED LIMIT"(R2-1)signs shall not be paid for directly, but shall be considered subsidiary to Item 502.
7. Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
8. Techniques that may help reduce traffic speeds include but are not limited to:
   A. Law enforcement.
   B. Flagger stationed next to sign.
   C. Portable changeable message sign (PCMS).
   D. Low-power (drone) radar transmitter.
   E. Speed monitor trailers or signs.
9. Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
10. For more specific guidance concerning the type of work, work zone conditions and factors impacting allowable regulatory construction speed zone reduction see TxDOT form #1204 in the TxDOT e-form system.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

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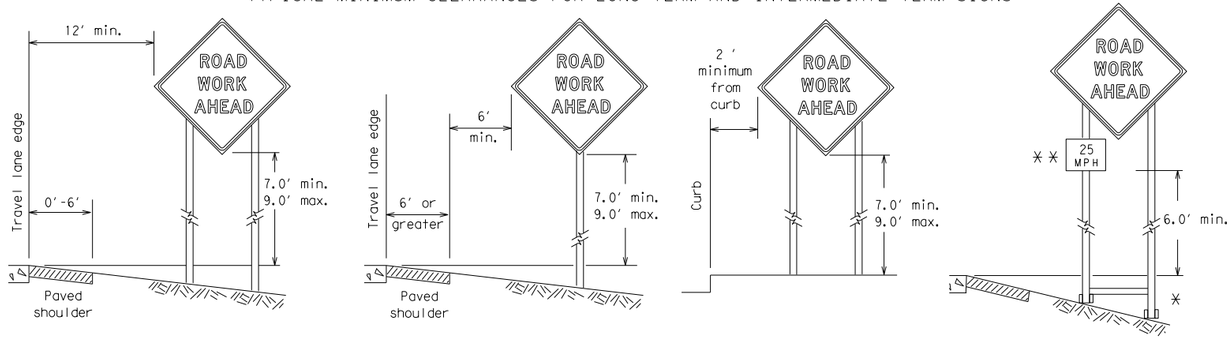
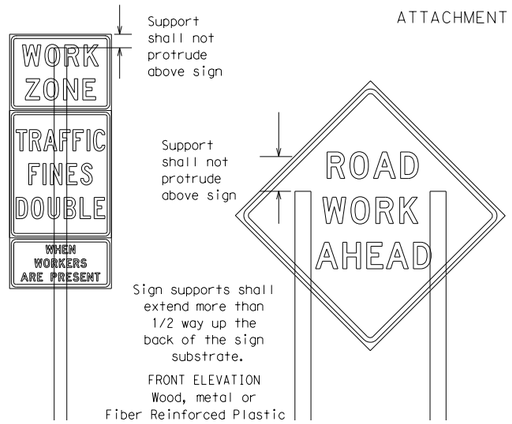
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

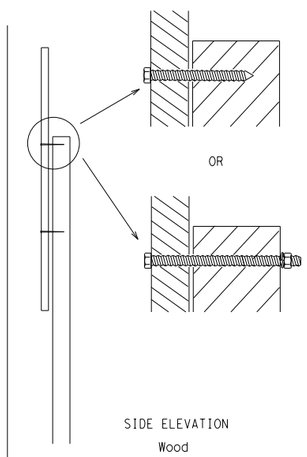


✳ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

✳✳ When plaques are placed on dual-leg supports, they should be attached to the upright nearest the travel lane. Supplemental plaques (advisory or distance) should not cover the surface of the parent sign.

ATTACHMENT FOR SIGN SUPPORTS





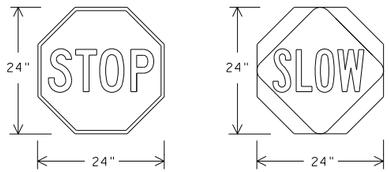
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

Nails shall NOT be allowed. Each sign shall be attached directly to the sign support. Multiple signs shall not be joined or spliced by any means. Wood supports shall not be extended or repaired by splicing or other means.

Splicing embedded perforated square metal tubing in order to extend post height will only be allowed when the splice is made using four bolts, two above and two below the spice point. Splice must be located entirely behind the sign substrate, not near the base of the support. Splice insert lengths should be at least 5 times nominal post size, centered on the splice and of at least the same gauge material.

STOP/SLOW PADDLES

1. STOP/SLOW paddles are the primary method to control traffic by flaggers. The STOP/SLOW paddle size should be 24" x 24".
2. STOP/SLOW paddles shall be retroreflectorized when used at night.
3. STOP/SLOW paddles may be attached to a staff with a minimum length of 6' to the bottom of the sign.
4. Any lights incorporated into the STOP or SLOW paddle faces shall only be as specifically described in Section 6E.03 Hand Signaling Devices in the TMUTCD.



SHEETING REQUIREMENTS (WHEN USED AT NIGHT)		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	ORANGE	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDER	WHITE	TYPE B OR C SHEETING
LEGEND & BORDER	BLACK	ACRYLIC NON-REFLECTIVE FILM

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

1. Permanent signs are used to give notice of traffic laws or regulations, call attention to conditions that are potentially hazardous to traffic operations, show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, specific service (LOGO), or cultural information. Drivers proceeding through a work zone need the same, if not better route guidance as normally installed on a roadway without construction.
2. When permanent regulatory or warning signs conflict with work zone conditions, remove or cover the permanent signs until the permanent sign message matches the roadway condition. For details for covering large guide signs see the TS-CD standard.
3. When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
4. If existing signs are to be relocated on their original supports, they shall be installed on crashworthy bases as shown on the SMD Standard sheets. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards. This work should be paid for under the appropriate pay item for relocating existing signs.
5. If permanent signs are to be removed and relocated using temporary supports, the Contractor shall use crashworthy supports as shown on the BC standard sheets, TLRS standard sheets or the CWZTCD list. The signs shall meet the required mounting heights shown on the BC, or the SMD standard sheets during construction. This work should be paid for under the appropriate pay item for relocating existing signs.
6. Any sign or traffic control device that is struck or damaged by the Contractor or his/her construction equipment shall be replaced as soon as possible by the Contractor to ensure proper guidance for the motorists. This will be subsidiary to Item 502.

GENERAL NOTES FOR WORK ZONE SIGNS

1. Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. All signs shall be installed in accordance with the plans or as directed by the Engineer. Signs shall be used to regulate, warn, and guide the traveling public safely through the work zone.
5. The Contractor may furnish either the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD). The Engineer/Inspector may require the Contractor to furnish other work zone signs that are shown in the TMUTCD but may have been omitted from the plans. Any variation in the plans shall be documented by written agreement between the Engineer and the Contractor's Responsible Person. All changes must be documented in writing before being implemented. This can include documenting the changes in the Inspector's TxDOT diary and having both the Inspector and Contractor initial and date the agreed upon changes.
6. The Contractor shall furnish sign supports listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD) for small roadside signs. Supports for temporary large roadside signs shall meet the requirements detailed on the Temporary Large Roadside Signs (TLRS) standard sheets.The Contractor shall install the sign support in accordance with the manufacturer's recommendations. If there is a question regarding installation procedures, the Contractor shall furnish the Engineer a copy of the manufacturer's installation recommendations so the Engineer can verify the correct procedures are being followed.
7. The Contractor is responsible for installing signs on approved supports and replacing signs with damaged or cracked substrates and/or damaged or marred reflective sheeting as directed by the Engineer/Inspector.
8. Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1 inch.
9. The Contractor shall replace damaged wood posts. New or damaged wood sign posts shall not be spliced.

DURATION OF WORK (as defined by the "Texas Manual on Uniform Traffic Control Devices" Part 6)

1. The types of sign supports, sign mounting height,the size of signs, and the type of sign substrates can vary based on the type of work being performed. The Engineer is responsible for selecting the appropriate size sign for the type of work being performed. The Contractor is responsible for ensuring the sign support, sign mounting height and substrate meets manufacturer's recommendations in regard to crashworthiness and duration of work requirements.
   a. Long-term stationary - work that occupies a location more than 3 days.
   b. Intermediate-term stationary - work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than one hour.
   c. Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
   d. Short, duration - work that occupies a location up to 1 hour.
   e. Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

SIGN MOUNTING HEIGHT

1. The bottom of Long-term/Intermediate-term signs shall be at least 7 feet, but not more than 9 feet, above the paved surface, except as shown for supplemental plaques mounted below other signs.
2. The bottom of Short-term/Short Duration signs shall be a minimum of 1 foot above the pavement surface but no more than 2 feet above the ground.
3. Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signing.
4. Short-term/Short Duration signs shall be used only during daylight and shall be removed at the end of the workday or raised to appropriate Long-term/Intermediate sign height.
5. Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

SIZE OF SIGNS

1. The Contractor shall furnish the sign sizes shown on BC (2) unless otherwise shown in the plans or as directed by the Engineer.

SIGN SUBSTRATES

1. The Contractor shall ensure the sign substrate is installed in accordance with the manufacturer's recommendations for the type of sign support that is being used. The CWZTCD lists each substrate that can be used on the different types and models of sign supports.
2. "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave.
3. All wooden individual sign panels fabricated from 2 or more pieces shall have one or more plywood cleat, 1/2" thick by 6" wide, fastened to the back of the sign and extending fully across the sign. The cleat shall be attached to the back of the sign using wood screws that do not penetrate the face of the sign panel. The screws shall be placed on both sides of the splice and spaced at 6" centers. The Engineer may approve other methods of splicing the sign face.

REFLECTIVE SHEETING

1. All signs shall be retroreflective and constructed of sheeting meeting the color and retro-reflectivity requirements of DMS-8300 for rigid signs or DMS-8310 for roll-up signs. The web address for DMS specifications is shown on BC(1).
2. White sheeting, meeting the requirements of DMS-8300 Type A, shall be used for signs with a white background.
3. Orange sheeting, meeting the requirements of DMS-8300 Type B_{FL} or Type C_{FL}, shall be used for rigid signs with orange backgrounds.

SIGN LETTERS

1. All sign letters and numbers shall be clear, and open rounded type uppercase alphabet letters as approved by the Federal Highway Administration (FHWA) and as published in the "Standard Highway Sign Design for Texas" manual. Signs, letters and numbers shall be of first class workmanship in accordance with Department Standards and Specifications.

REMOVING OR COVERING

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
2. Long-term stationary or intermediate stationary signs installed on square metal tubing may be turned away from traffic 90 degrees when the sign message is not applicable. This technique may not be used for signs installed in the median of divided highways or near any intersections where the sign may be seen from approaching traffic.
3. Signs installed on wooden skids shall not be turned at 90 degree angles to the roadway. These signs should be removed or completely covered when not required.
4. When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the entire sign face and maintain their opaque properties under automobile headlights at night, without damaging the sign sheeting.
5. Burlap shall NOT be used to cover signs.
6. Duct tape or other adhesive material shall NOT be affixed to a sign face.
7. Signs and anchor stubs shall be removed and holes backfilled upon completion of work.

SIGN SUPPORT WEIGHTS

1. Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
4. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs.
5. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall NOT be used.
6. Rubber ballasts designed for channelizing devices should not be used for ballast on portable sign supports. Sign supports designed and manufactured with rubber bases may be used when shown on the CWZTCD list.
7. Sandbags shall only be placed along or laid over the base supports of the traffic control device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners. Sandbags shall be placed along the length of the skids to weigh down the sign support.
8. Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

FLAGS ON SIGNS

1. Flags may be used to draw attention to warning signs. When used, the flag shall be 16 inches square or larger and shall be orange or fluorescent red-orange in color. Flags shall not be allowed to cover any portion of the sign face.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

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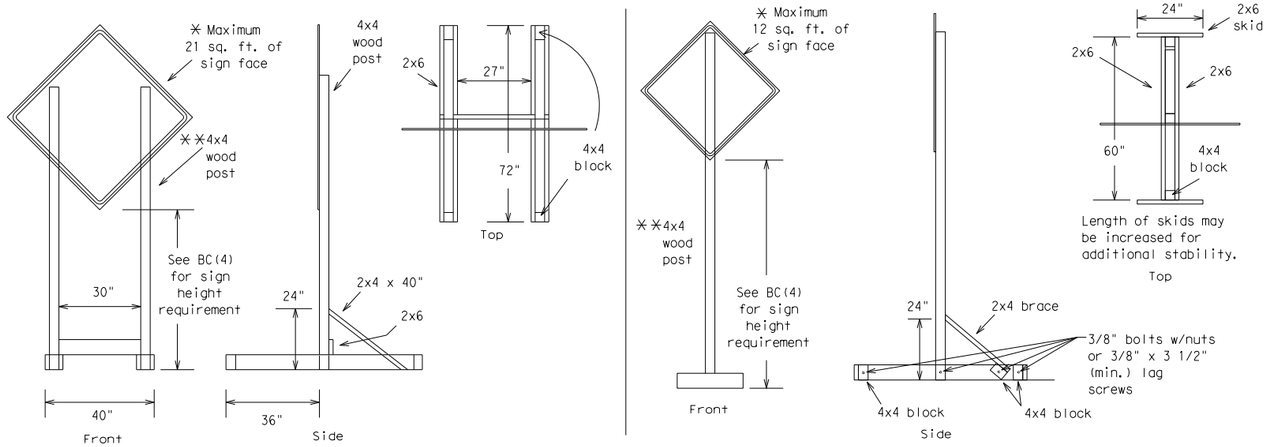
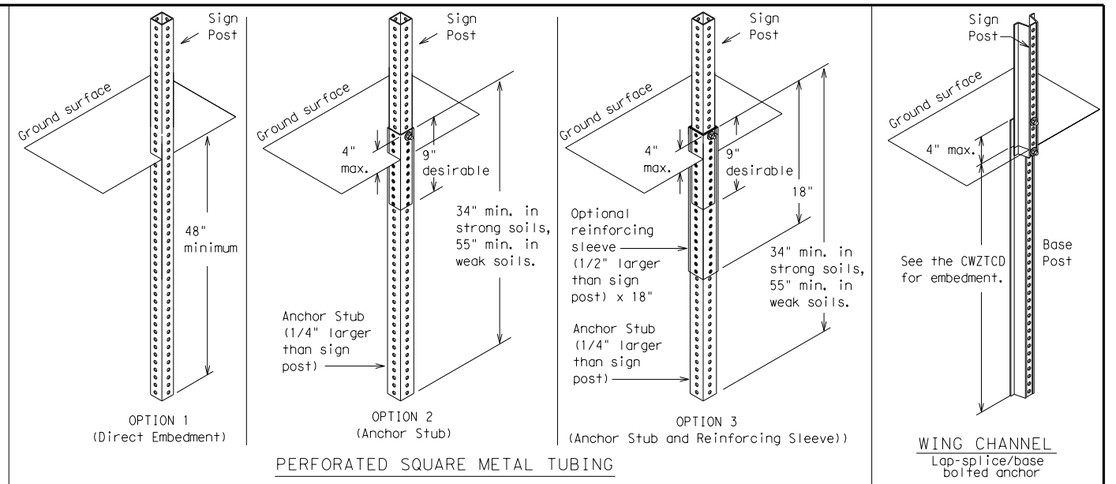


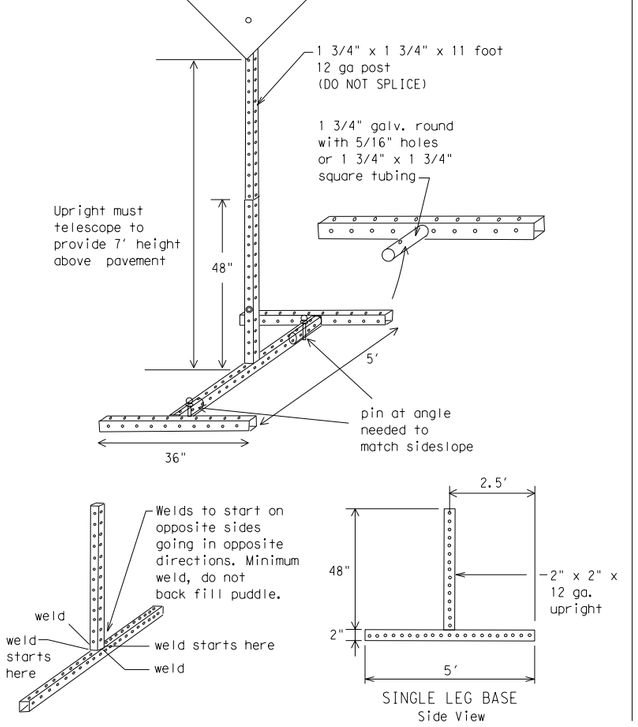
SKID MOUNTED WOOD SIGN SUPPORTS

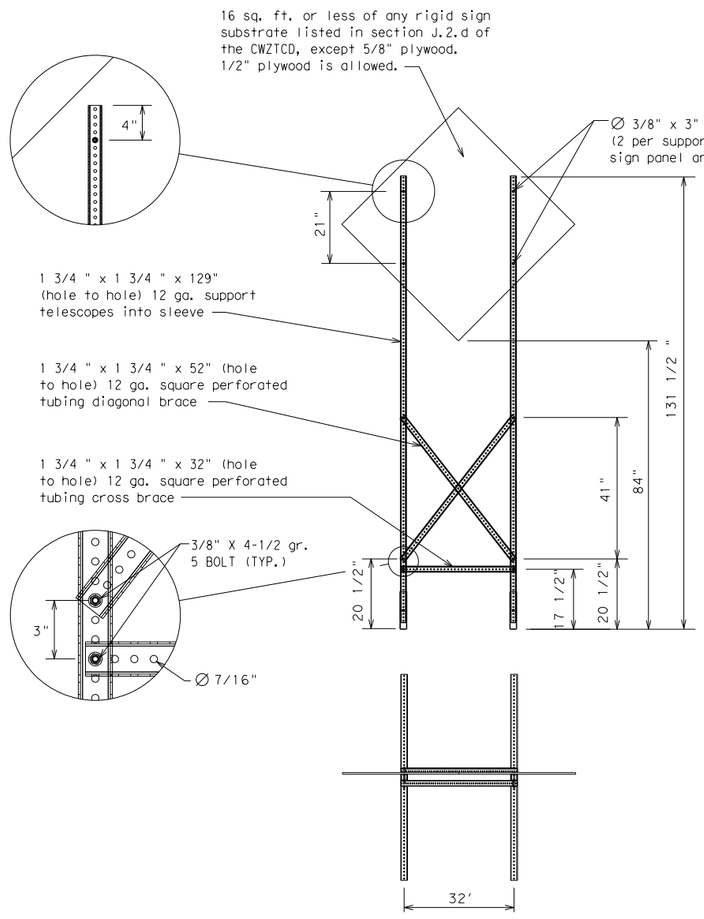
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

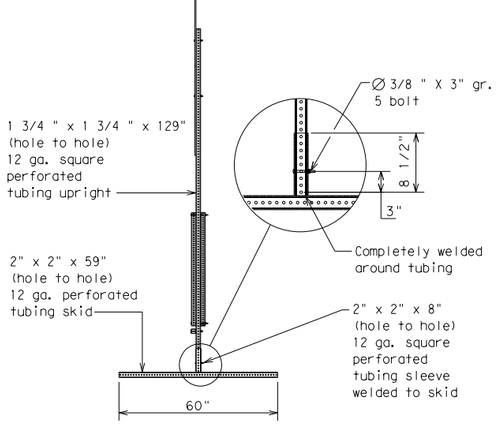


GROUND MOUNTED SIGN SUPPORTS

Refer to the CWZTCD and the manufacturer's installation procedure for each type sign support.
The maximum sign square footage shall adhere to the manufacturer's recommendation.
Two post installations can be used for larger signs.







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

WEDGE ANCHORS

Both steel and plastic Wedge Anchor Systems as shown on the SMD Standard Sheets may be used as temporary sign supports for signs up to 10 square feet of sign face. They may be set in concrete or in sturdy soils if approved by the Engineer. (See web address for "Traffic Engineering Standard Sheets" on BC(1)).

OTHER DESIGNS

MORE DETAILS OF APPROVED LONG/INTERMEDIATE AND SHORT TERM SUPPORTS CAN BE FOUND ON THE CWZTCD LIST. SEE BC(1) FOR WEBSITE LOCATION.

GENERAL NOTES

1. Nails may be used in the assembly of wooden sign supports, but 3/8" bolts with nuts or 3/8" x 3 1/2" lag screws must be used on every joint for final connection.
2. No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
3. When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered subsidiary to Item 502.

* See BC(4) for definition of "Work Duration."

** Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.

☐ See the CWZTCD for the type of sign substrate that can be used for each approved sign support.

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0073	02	088,ETC	US 281
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	BEXAR		26

DATE: 3/19/2024 9:37:09 PM
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WHEN NOT IN USE, REMOVE THE PCMS FROM THE RIGHT-OF-WAY OR PLACE THE PCMS BEHIND BARRIER OR GUARDRAIL WITH SIGN PANEL TURNED PARALLEL TO TRAFFIC

PORTABLE CHANGEABLE MESSAGE SIGNS

1. The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
2. Messages on PCMS should contain no more than 8 words (about four to eight characters per word), not including simple words such as "TO," "FOR," "AT," etc.
3. Messages should consist of a single phase, or two phases that alternate. Three-phase messages are not allowed. Each phase of the message should convey a single thought, and must be understood by itself.
4. Use the word "EXIT" to refer to an exit ramp on a freeway; i.e., "EXIT CLOSED." Do not use the term "RAMP."
5. Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
6. When in use, the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
7. The message term "WEEKEND" should be used only if the work is to start on Saturday morning and end by Sunday evening at midnight. Actual days and hours of work should be displayed on the PCMS if work is to begin on Friday evening and/or continue into Monday morning.
8. The Engineer/Inspector may select one of two options which are available for displaying a two-phase message on a PCMS. Each phase may be displayed for either four seconds each or for three seconds each.
9. Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
10. Do not present redundant information on a two-phase message; i.e., keeping two lines of the message the same and changing the third line.
11. Do not use the word "Danger" in message.
12. Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
13. Do not display messages that scroll horizontally or vertically across the face of the sign.
14. The following table lists abbreviated words and two-word phrases that are acceptable for use on a PCMS. Both words in a phrase must be displayed together. Words or phrases not on this list should not be abbreviated, unless shown in the TMUTCD.
15. PCMS character height should be at least 18 inches for trailer mounted units. They should be visible from at least 1/2 (.5) mile and the text should be legible from at least 600 feet at night and 800 feet in daylight. Truck mounted units must have a character height of 10 inches and must be legible from at least 400 feet.
16. Each line of text should be centered on the message board rather than left or right justified.
17. If disabled, the PCMS should default to an illegible display that will not alarm motorists and will only be used to alert workers that the PCMS has malfunctioned. A pattern such as a series of horizontal solid bars is appropriate.

WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD
Alternate	ALT
Avenue	AVE
Best Route	BEST RTE
Boulevard	BLVD
Bridge	BRDG
Cannot	CANT
Center	CTR
Construction Ahead	CONST AHD
CROSSING	XING
Detour Route	DETOUR RTE
Do Not	DONT
East	E
Eastbound	(route) E
Emergency	EMER
Emergency Vehicle	EMER VEH
Entrance, Enter	ENT
Express Lane	EXP LN
Expressway	EXPWY
XXXX Feet	XXXX FT
Fog Ahead	FOG AHD
Freeway	FRWY, FWY
Freeway Blocked	FWY BLKD
Friday	FRI
Hazardous Driving	HAZ DRIVING
Hazardous Material	HAZMAT
High-Occupancy	HOV
Vehicle Highway	HWY
Hour(s)	HR, HRS
Information	INFO
It Is	ITS
Junction	JCT
Left	LFT
Left Lane	LFT LN
Lane Closed	LN CLOSED
Lower Level	LWR LEVEL
Maintenance	MAINT

WORD OR PHRASE	ABBREVIATION
Major	MAJ
Miles	MI
Miles Per Hour	MPH
Minor	MNR
Monday	MON
Normal	NORM
North	N
Northbound	(route) N
Parking	PKING
Road	RD
Right Lane	RT LN
Saturday	SAT
Service Road	SERV RD
Shoulder	SHLDR
Slippery	SLIP
South	S
Southbound	(route) S
Speed	SPD
Street	ST
Sunday	SUN
Telephone	PHONE
Temporary	TEMP
Thursday	THURS
To Downtown	TO DWNTN
Traffic	TRAF
Travelers	TRVLRS
Tuesday	TUES
Time Minutes	TIME MIN
Upper Level	UPR LEVEL
Vehicles (s)	VEH, VEHS
Warning	WARN
Wednesday	WED
Weight Limit	WT LIMIT
West	W
Westbound	(route) W
Wet Pavement	WET PVMT
Will Not	WONT

Roadway designation # IH-number, US-number, SH-number, FM-number

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

(The Engineer may approve other messages not specifically covered here.)

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

FREEWAY CLOSED X MILE	FRONTAGE ROAD CLOSED
ROAD CLOSED AT SH XXX	SHOULDER CLOSED XXX FT
ROAD CLSD AT FM XXXX	RIGHT LN CLOSED XXX FT
RIGHT X LANES CLOSED	RIGHT X LANES OPEN
CENTER LANE CLOSED	DAYTIME LANE CLOSURES
NIGHT LANE CLOSURES	I-XX SOUTH EXIT CLOSED
VARIOUS LANES CLOSED	EXIT XXX CLOSED X MILE
EXIT CLOSED	RIGHT LN TO BE CLOSED
MALL DRIVEWAY CLOSED	X LANES CLOSED TUE - FRI
XXXXXXXX BLVD CLOSED	

Other Condition List

ROADWORK XXX FT	ROAD REPAIRS XXXX FT
FLAGGER XXXX FT	LANE NARROWS XXXX FT
RIGHT LN NARROWS XXXX FT	TWO-WAY TRAFFIC XX MILE
MERGING TRAFFIC XXXX FT	CONST TRAFFIC XXX FT
LOOSE GRAVEL XXXX FT	UNEVEN LANES XXXX FT
DETOUR X MILE	ROUGH ROAD XXXX FT
ROADWORK PAST SH XXXX	ROADWORK NEXT FRI-SUN
BUMP XXXX FT	US XXX EXIT X MILES
TRAFFIC SIGNAL XXXX FT	LANES SHIFT *

* LANES SHIFT in Phase 1 must be used with STAY IN LANE in Phase 2.

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

MERGE RIGHT	FORM X LINES RIGHT
DETOUR NEXT X EXITS	USE XXXXX RD EXIT
USE EXIT XXX	USE EXIT I-XX NORTH
STAY ON US XXX SOUTH	USE I-XX E TO I-XX N
TRUCKS USE US XXX N	WATCH FOR TRUCKS
WATCH FOR TRUCKS	EXPECT DELAYS
EXPECT DELAYS	PREPARE TO STOP
REDUCE SPEED XXX FT	END SHOULDER USE
USE OTHER ROUTES	WATCH FOR WORKERS
STAY IN LANE *	

* STAY IN LANE in Phase 2 must be used with LANES SHIFT in Phase 1.

Location List

AT FM XXXX
BEFORE RAILROAD CROSSING
NEXT X MILES
PAST US XXX EXIT
XXXXXXX TO XXXXXXX
US XXX TO FM XXXX

Warning List

SPEED LIMIT XX MPH
MAXIMUM SPEED XX MPH
MINIMUM SPEED XX MPH
ADVISORY SPEED XX MPH
RIGHT LANE EXIT
USE CAUTION
DRIVE SAFELY
DRIVE WITH CARE

** Advance Notice List

TUE-FRI XX AM- X PM
APR XX-27 X PM-X AM
BEGINS MONDAY
BEGINS MAY XX
MAY X-X XX PM - XX AM
NEXT FRI-SUN
XX AM TO XX PM
NEXT TUE AUG XX
TONIGHT XX PM- XX AM

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

1. Only 1 or 2 phases are to be used on a PCMS.
2. The 1st phase (or both) should be selected from the "Road/Lane/Ramp Closure List" and the "Other Condition List".
3. A 2nd phase can be selected from the "Action to Take/Effect on Travel, Location, General Warning, or Advance Notice Phase Lists".
4. A Location Phase is necessary only if a distance or location is not included in the first phase selected.
5. If two PCMS are used in sequence, they must be separated by a minimum of 1000 ft. Each PCMS shall be limited to two phases, and should be understandable by themselves.
6. For advance notice, when the current date is within seven days of the actual work date, calendar days should be replaced with days of the week. Advance notification should typically be for no more than one week prior to the work.

WORDING ALTERNATIVES

1. The words RIGHT, LEFT and ALL can be interchanged as appropriate.
2. Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
3. EAST, WEST, NORTH and SOUTH (or abbreviations E, W, N and S) can be interchanged as appropriate.
4. Highway names and numbers replaced as appropriate.
5. ROAD, HIGHWAY and FREEWAY can be interchanged as needed.
6. AHEAD may be used instead of distances if necessary.
7. FT and MI, MILE and MILES interchanged as appropriate.
8. AT, BEFORE and PAST interchanged as needed.
9. Distances or AHEAD can be eliminated from the message if a location phase is used.

PCMS SIGNS WITHIN THE R.O.W. SHALL BE BEHIND GUARDRAIL OR CONCRETE BARRIER OR SHALL HAVE A MINIMUM OF FOUR (4) PLASTIC DRUMS PLACED PERPENDICULAR TO TRAFFIC ON THE UPSTREAM SIDE OF THE PCMS, WHEN EXPOSED TO ONE DIRECTION OF TRAFFIC. WHEN EXPOSED TO TWO WAY TRAFFIC, THE FOUR DRUMS SHOULD BE PLACED WITH ONE DRUM AT EACH OF THE FOUR CORNERS OF THE UNIT.

FULL MATRIX PCMS SIGNS

1. When Full Matrix PCMS signs are used, the character height and legibility/visibility requirements shall be maintained as listed in Note 15 under "PORTABLE CHANGEABLE MESSAGE SIGNS" above.
2. When symbol signs, such as the "Flagger Symbol"(CW20-7) are represented graphically on the Full Matrix PCMS sign and, with the approval of the Engineer, it shall maintain the legibility/visibility requirement listed above.
3. When symbol signs are represented graphically on the Full Matrix PCMS, they shall only supplement the use of the static sign represented, and shall not substitute for, or replace that sign.
4. A full matrix PCMS may be used to simulate a flashing arrow board provided it meets the visibility, flash rate and dimming requirements on BC(7), for the same size arrow.

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0073	02	088,ETC	US 281
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	BEXAR		27

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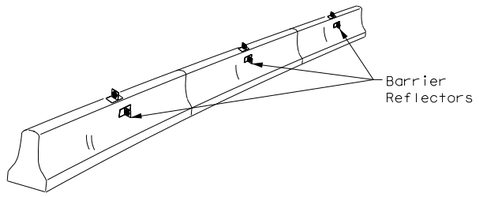
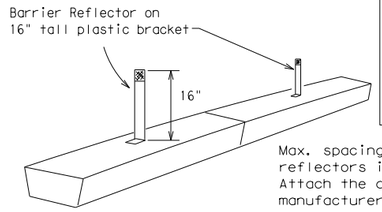
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 512.



CONCRETE TRAFFIC BARRIER (CTB)

3. Where traffic is on one side of the CTB, two (2) Barrier Reflectors shall be mounted in approximately the midsection of each section of CTB. An alternate mounting location is uniformly spaced at one end of each CTB. This will allow for attachment of a barrier grapple without damaging the reflector. The Barrier Reflector mounted on the side of the CTB shall be located directly below the reflector mounted on top of the barrier, as shown in the detail above.
4. Where CTB separates two-way traffic, three barrier reflectors shall be mounted on each section of CTB. The reflector unit on top shall have two yellow reflective faces (Bi-Directional)while the reflectors on each side of the barrier shall have one yellow reflective face, as shown in the detail above.
5. When CTB separates traffic traveling in the same direction, no barrier reflectors will be required on top of the CTB.
6. Barrier Reflector units shall be yellow or white in color to match the edgeline being supplemented.
7. Maximum spacing of Barrier Reflectors is forty (40) feet.
8. Pavement markers or temporary flexible-reflective roadway marker tabs shall NOT be used as CTB delineation.
9. Attachment of Barrier Reflectors to CTB shall be per manufacturer's recommendations.
10. Missing or damaged Barrier Reflectors shall be replaced as directed by the Engineer.
11. Single slope barriers shall be delineated as shown on the above detail.

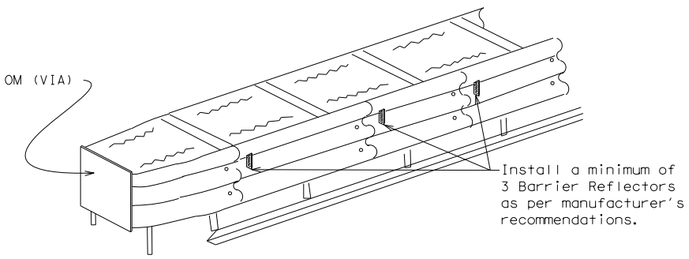


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB)

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

LPCB is approved for use in work zone locations, where the posted speed is 45mph, or less. See Roadway Standard Sheet LPCB.

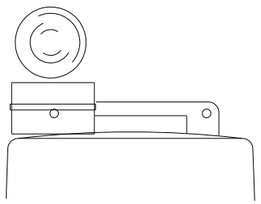


DELINEATION OF END TREATMENTS

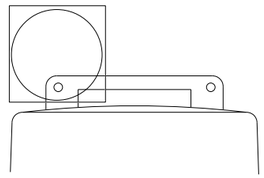
END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet the apppropriate crashworthy standards as defined in the Manual for Assessing Safety Hardware (MASH). Refer to the CWZTCD List for approved end treatments and manufacturers.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.



Warning reflector may be round or square.Must have a yellow reflective surface area of at least 30 square inches

WARNING LIGHTS

1. Warning lights shall meet the requirements of the TMUTCD.
2. Warning lights shall NOT be installed on barricades.
3. Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "FL". The Type A Warning Lights shall not be used with signs manufactured with Type B_{FL} or C_{FL} Sheeting meeting the requirements of Departmental Material Specification DMS-8300.
4. Type-C and Type D 360 degree Steady Burn Lights are intended to be used in a series for delineation to supplement other traffic control devices. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "SB".
5. The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices.
6. When required by the Engineer, the Contractor shall furnish a copy of the warning lights certification. The warning light manufacturer will certify the warning lights meet the requirements of the latest ITE Purchase Specifications for Flashing and Steady-Burn Warning Lights.
7. When used to delineate curves, Type-C and Type D Steady Burn Lights should only be placed on the outside of the curve, not the inside.
8. The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

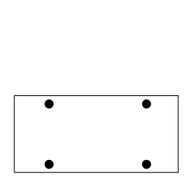
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing devices to form a merging taper may be used for delineation. If used, the successive flashing of the sequential warning lights should occur from the beginning of the taper to the end of the merging taper in order to identify the desired vehicle path. The rate of flashing for each light shall be 65 flashes per minute, plus or minus 10 flashes.
4. Type C and D steady-burn warning lights are intended to be used in a series to delineate the edge of the travel lane on detours, on lane changes, on lane closures, and on other similar conditions.
5. Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
6. Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
7. The maximum spacing for warning lights on drums should be identical to the channelizing device spacing.

WARNING REFLECTORS MOUNTED ON PLASTIC DRUMS AS A SUBSTITUTE FOR TYPE C (STEADY BURN) WARNING LIGHTS

1. A warning reflector or approved substitute may be mounted on a plastic drum as a substitute for a Type C, steady burn warning light at the discretion of the Contractor unless otherwise noted in the plans.
2. The warning reflector shall be yellow in color and shall be manufactured using a sign substrate approved for use with plastic drums listed on the CWZTCD.
3. The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
4. Round reflectors shall be fully reflectorized, including the area where attached to the drum.
5. Square substrates must have a minimum of 30 square inches of reflectorized sheeting. They do not have to be reflectorized where it attaches to the drum.
6. The side of the warning reflector facing approaching traffic shall have sheeting meeting the color and retroreflectivity requirements for DMS 8300-Type B or Type C.
7. When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
8. The warning reflector should be mounted on the side of the handle nearest approaching traffic.
9. The maximum spacing for warning reflectors should be identical to the channelizing device spacing requirements.

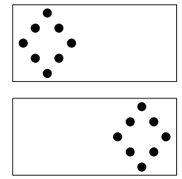
Arrow Boards may be located behind channelizing devices in place for a shoulder taper or merging taper, otherwise they shall be delineated with four (4) channelizing devices placed perpendicular to traffic on the upstream side of traffic.

1. The Flashing Arrow Board should be used for all lane closures on multi-lane roadways, or slow moving maintenance or construction activities on the travel lanes.
2. Flashing Arrow Boards should not be used on two-lane, two-way roadways, detours, diversions or work on shoulders unless the "CAUTION" display (see detail below) is used.
3. The Engineer/Inspector shall choose all appropriate signs, barricades and/or other traffic control devices that should be used in conjunction with the Flashing Arrow Board.
4. The Flashing Arrow Board should be able to display the following symbols:

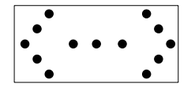


4 CORNER CAUTION

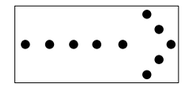
OR



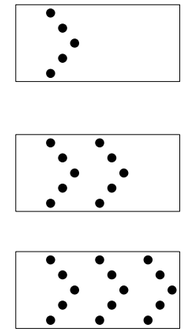
ALTERNATING DIAMOND CAUTION



DOUBLE ARROW



RIGHT/LEFT ARROW
(right arrow shown; left is similar)



RIGHT/LEFT SEQUENTIAL CHEVRON
(right chevron shown; left is similar)

5. The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
6. The straight line caution display is NOT ALLOWED.
7. The Flashing Arrow Board shall be capable of minimum 50 percent dimming from rated lamp voltage. The flashing rate of the lamps shall not be less than 25 nor more than 40 flashes per minute.
8. Minimum lamp "on time" shall be approximately 50 percent for the flashing arrow and equal intervals of 25 percent for each sequential phase of the flashing chevron.
9. The sequential arrow display is NOT ALLOWED.
10. The flashing arrow display is the TxDOT standard; however, the sequential chevron display may be used during daylight operations.
11. The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
12. A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
13. A full matrix PCMS may be used to simulate a Flashing Arrow Board provided it meets visibility, flash rate and dimming requirements on this sheet for the same size arrow.
14. Minimum mounting height of trailer mounted Arrow Boards should be 7 feet from roadway to bottom of panel.

REQUIREMENTS			
TYPE	MINIMUM SIZE	MINIMUM NUMBER OF PANEL LAMPS	MINIMUM VISIBILITY DISTANCE
B	30 x 60	13	3/4 mile
C	48 x 96	15	1 mile

ATTENTION
Flashing Arrow Boards shall be equipped with automatic dimming devices.

WHEN NOT IN USE, REMOVE THE ARROW BOARD FROM THE RIGHT-OF-WAY OR PLACE THE ARROW BOARD BEHIND CONCRETE TRAFFIC BARRIER OR GUARDRAIL.

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

1. Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the Manual for Assessing Safety Hardware (MASH).
2. Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
3. Refer to the CWZTCD for a list of approved TMAs.
4. TMAs are required on freeways unless otherwise noted in the plans.
5. A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
6. The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is an extended distance from the TMA.

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION ARROW PANEL, REFLECTORS, WARNING LIGHTS & ATTENUATOR

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	BEXAR		28

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GENERAL NOTES

1. For long term stationary work zones on freeways, drums shall be used as the primary channelizing device.
2. For intermediate term stationary work zones on freeways, drums should be used as the primary channelizing device but may be replaced in tangent sections by vertical panels, or 42" two-piece cones. In tangent sections, one-piece cones may be used with the approval of the Engineer but only if personnel are present on the project at all times to maintain the cones in proper position and location.
3. For short term stationary work zones on freeways, drums are the preferred channelizing device but may be replaced in tapers, transitions and tangent sections by vertical panels, two-piece cones or one-piece cones as approved by the Engineer.
4. Drums and all related items shall comply with the requirements of the current version of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
5. Drums, bases, and related materials shall exhibit good workmanship and shall be free from objectionable marks or defects that would adversely affect their appearance or serviceability.
6. The Contractor shall have a maximum of 24 hours to replace any plastic drums identified for replacement by the Engineer/Inspector. The replacement device must be an approved device.

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

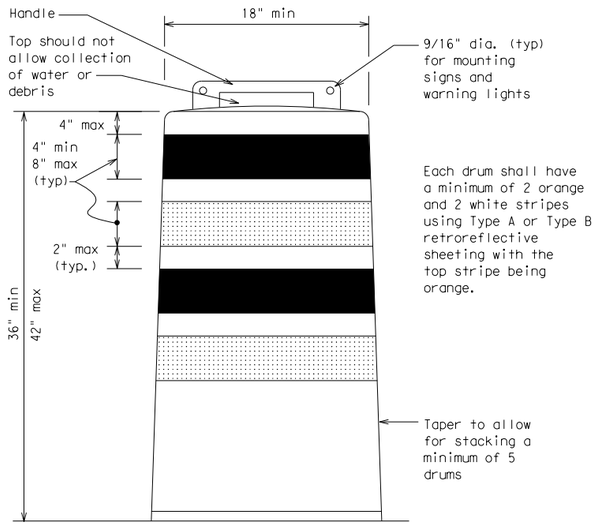
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents accidental separation due to normal handling and/or air turbulence created by passing vehicles.
3. Plastic drums shall be constructed of lightweight flexible, and deformable materials. The Contractor shall NOT use metal drums or single piece plastic drums as channelization devices or sign supports.
4. Drums shall present a profile that is a minimum of 18 inches in width at the 36 inch height when viewed from any direction. The height of drum unit (body installed on base) shall be a minimum of 36 inches and a maximum of 42 inches.
5. The top of the drum shall have a built-in handle for easy pickup and shall be designed to drain water and not collect debris. The handle shall have a minimum of two widely spaced 9/16 inch diameter holes to allow attachment of a warning light, warning reflector unit or approved compliant sign.
6. The exterior of the drum body shall have a minimum of four alternating orange and white retroreflective circumferential stripes not less than 4 inches nor greater than 8 inches in width. Any non-reflectorized space between any two adjacent stripes shall not exceed 2 inches in width.
7. Bases shall have a maximum width of 36 inches, a maximum height of 4 inches, and a minimum of two footholds of sufficient size to allow base to be held down while separating the drum body from the base.
8. Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
9. Drum body shall have a maximum unballasted weight of 11 lbs.
10. Drum and base shall be marked with manufacturer's name and model number.

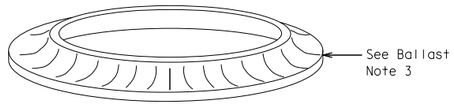
RETROREFLECTIVE SHEETING

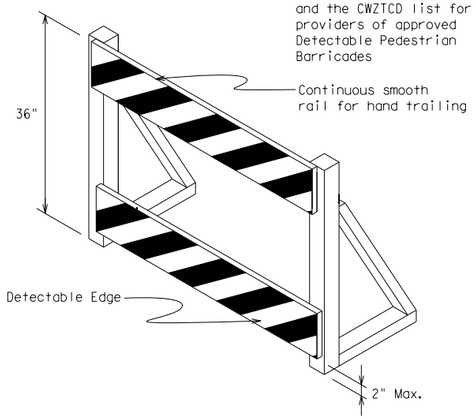
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall be suitable for use on and shall adhere to the drum surface such that, upon vehicular impact, the sheeting shall remain adhered in-place and exhibit no delaminating, cracking, or loss of retroreflectivity other than that loss due to abrasion of the sheeting surface.

BALLAST

1. Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other ballasting devices as approved by the Engineer. Stacking of sandbags will be allowed, however height of sandbags above pavement surface may not exceed 12 inches.
2. Bases with built-in ballast shall weigh between 40 lbs. and 50 lbs. Built-in ballast can be constructed of an integral crumb rubber base or a solid rubber base.
3. Recycled truck tire sidewalls may be used for ballast on drums approved for this type of ballast on the CWZTCD list.
4. The ballast shall not be heavy objects, water, or any material that would become hazardous to motorists, pedestrians, or workers when the drum is struck by a vehicle.
5. When used in regions susceptible to freezing, drums shall have drainage holes in the bottoms so that water will not collect and freeze becoming a hazard when struck by a vehicle.
6. Ballast shall not be placed on top of drums.
7. Adhesives may be used to secure base of drums to pavement.

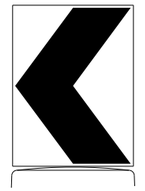




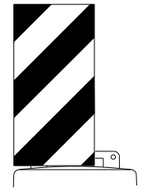


DETECTABLE PEDESTRIAN BARRICADES

1. When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility. Refer to WZ(BTS-2) for Pedestrian Control requirements for Sidewalk Diversions, Sidewalk Detours and Crosswalk Closures.
2. Where pedestrians with visual disabilities normally use the closed sidewalk, a Detectable Pedestrian Barricade shall be placed across the full width of the closed sidewalk instead of a Type 3 Barricade.
3. Detectable pedestrian barricades similar to the one pictured above, longitudinal channelizing devices, some concrete barriers, and wood or chain link fencing with a continuous detectable edging can satisfactorily delineate a pedestrian path.
4. Tape, rope, or plastic chain strung between devices are not detectable, do not comply with the design standards in the "Americans with Disabilities Act Accessibility Guidelines (ADAAG)" and should not be used as a control for pedestrian movements.
5. Warning lights shall not be attached to detectable pedestrian barricades.
6. Detectable pedestrian barricades should use 8" nominal barricade rails as shown on BC(10) provided that the top rail provides a smooth continuous rail suitable for hand trailing with no splinters, burrs, or sharp edges.



18" x 24" Sign
(Maximum Sign Dimension)
Chevron CW1-8, Opposing Traffic Lane Divider, Driveway sign D70a, Keep Right R4 series or other signs as approved by Engineer



12" x 24"
Vertical Panel
mount with diagonals sloping down towards travel way

Plywood, Aluminum or Metal sign substrates shall NOT be used on plastic drums

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

1. Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
2. Chevrons and other work zone signs with an orange background shall be manufactured with Type B_{FL} or Type C_{FL} Orange sheeting meeting the color and retroreflectivity requirements of DMS-8300, "Sign Face Material," unless otherwise specified in the plans.
3. Vertical Panels shall be manufactured with orange and white sheeting meeting the requirements of DMS-8300 Type A or Type B. Diagonal stripes on Vertical Panels shall slope down toward the intended traveled lane.
4. Other sign messages (text or symbolic) may be used as approved by the Engineer. Sign dimensions shall not exceed 18 inches in width or 24 inches in height, except for the R9 series signs discussed in note 8 below.
5. Signs shall be installed using a 1/2 inch bolt (nominal) and nut, two washers, and one locking washer for each connection.
6. Mounting bolts and nuts shall be fully engaged and adequately torqued. Bolts should not extend more than 1/2 inch beyond nuts.
7. Chevrons may be placed on drums on the outside of curves, on merging tapers or on shifting tapers. When used in these locations, they may be placed on every drum or spaced not more than on every third drum. A minimum of three (3) should be used at each location called for in the plans.
8. R9-9, R9-10, R9-11 and R9-11a Sidewalk Closed signs which are 24 inches wide may be mounted on plastic drums, with approval of the Engineer.

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

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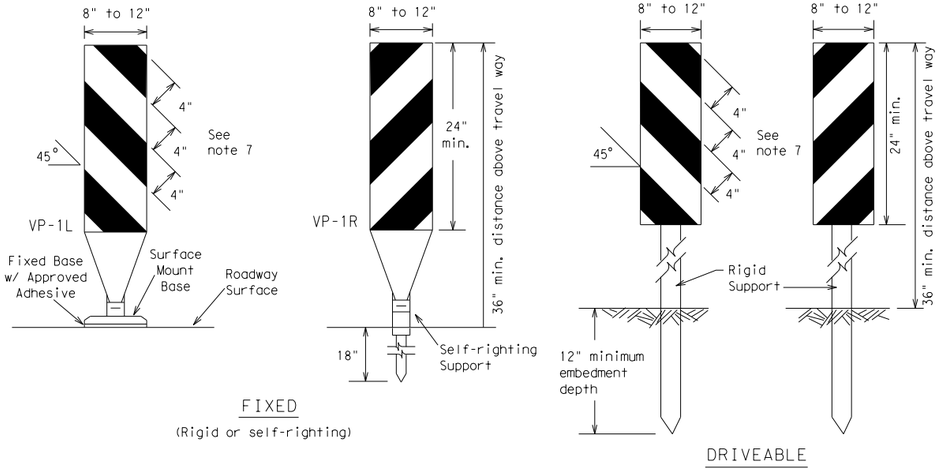
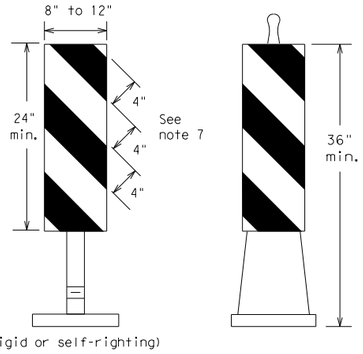


FIXED
(Rigid or self-righting)

DRIVEABLE

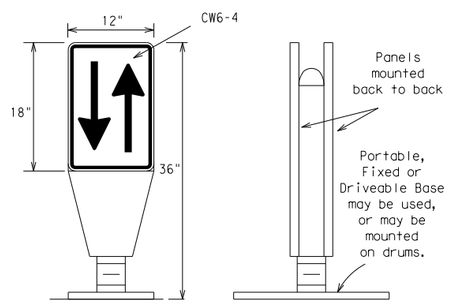


(Rigid or self-righting)

PORTABLE

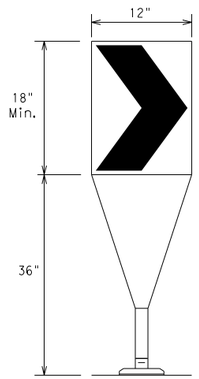
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is required. The Engineer/Inspector shall refer to the Roadway Design Manual for additional requirements on the use VP's for drop-offs.
3. VP's should be mounted back to back if used at the edge of cuts adjacent to two-way two lane roadways. Stripes are to be reflective orange and reflective white and should always slope downward toward the travel lane.
4. VP's used on expressways and freeways or other high speed roadways, may have more than 270 square inches of retroreflective area facing traffic.
5. Self-righting supports are available with portable base. See "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
6. Sheeting for the VP's shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
7. Where the height of reflective material on the vertical panel is 36 inches or greater, a panel stripe of 6 inches shall be used.

VERTICAL PANELS (VPs)



1. Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert a normal one-way roadway section to two-way operation. OTLD's are used on temporary centerlines. The upward and downward arrows on the sign's face indicate the direction of traffic on either side of the divider. The base is secured to the pavement with an adhesive or rubber weight to minimize movement caused by a vehicle impact or wind gust.
2. The OTLD may be used in combination with 42" cones or VPs.
3. Spacing between the OTLD shall not exceed 500 feet. 42" cones or VPs placed between the OTLD's should not exceed 100 foot spacing.
4. The OTLD shall be orange with a black non-reflective legend. Sheeting for the OTLD shall be retroreflective Type B_{FL} or Type C_{FL} conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



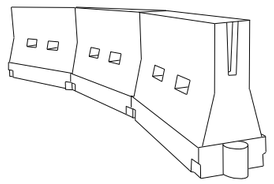
Fixed Base w/ Approved Adhesive
(Driveable Base, or Flexible Support can be used)

1. The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
2. Chevrons are intended to give notice of a sharp change of alignment with the direction of travel and provide additional emphasis and guidance for vehicle operators with regard to changes in horizontal alignment of the roadway.
3. Chevrons, when used, shall be erected on the outside of a sharp curve or turn, or on the far side of an intersection. They shall be in line with and at right angles to approaching traffic. Spacing should be such that the motorist always has three in view, until the change in alignment eliminates its need.
4. To be effective, the chevron should be visible for at least 500 feet.
5. Chevrons shall be orange with a black nonreflective legend. Sheeting for the chevron shall be retroreflective Type B_{FL} or Type C_{FL} conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.
6. For Long Term Stationary use on tapers or transitions on freeways and divided highways, self-righting chevrons may be used to supplement plastic drums but not to replace plastic drums.

CHEVRONS

GENERAL NOTES

1. Work Zone channelizing devices illustrated on this sheet may be installed in close proximity to traffic and are suitable for use on high or low speed roadways. The Engineer/Inspector shall ensure that spacing and placement is uniform and in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
2. Channelizing devices shown on this sheet may have a driveable, fixed or portable base. The requirement for self-righting channelizing devices must be specified in the General Notes or other plan sheets.
3. Channelizing devices on self-righting supports should be used in work zone areas where channelizing devices are frequently impacted by errant vehicles or vehicle related wind gusts making alignment of the channelizing devices difficult to maintain. Locations of these devices shall be detailed elsewhere in the plans. These devices shall conform to the TMUTCD and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
4. The Contractor shall maintain devices in a clean condition and replace damaged, nonreflective, faded, or broken devices and bases as required by the Engineer/Inspector. The Contractor shall be required to maintain proper device spacing and alignment.
5. Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
6. Pavement surfaces shall be prepared in a manner that ensures proper bonding between the adhesives, the fixed mount bases and the pavement surface. Adhesives shall be prepared and applied according to the manufacturer's recommendations.
7. The installation and removal of channelizing devices shall not cause detrimental effects to the final pavement surfaces, including pavement surface discoloration or surface integrity. Driveable bases shall not be permitted on final pavement surfaces. The Engineer/Inspector shall approve all application and removal procedures of fixed bases.



LONGITUDINAL CHANNELIZING DEVICES (LCD)

1. LCDs are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to contain or redirect a vehicle on impact.
2. LCDs may be used instead of a line of cones or drums.
3. LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
5. LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
6. LCDs used as barricades placed perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rails as shown on BC(10). Place reflective sheeting near the top of the LCD along the full length of the device.

WATER BALLASTED SYSTEMS USED AS BARRIERS

1. Water ballasted systems used as barriers shall not be used solely to channelize road users, but also to protect the work space per the appropriate Manual for Assessing Safety Hardware (MASH) crashworthiness requirements based on roadway speed and barrier application.
2. Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
3. Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
5. When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

If used to channelize pedestrians, longitudinal channelizing devices or water ballasted systems must have a continuous detectable bottom for users of long canes and the top of the unit shall not be less than 32 inches in height.

HOLLOW OR WATER BALLASTED SYSTEMS USED AS LONGITUDINAL CHANNELIZING DEVICES OR BARRIERS

Posted Speed	Formula	Minimum Desirable Taper Lengths ✳✳			Suggested Maximum Spacing of Channelizing Devices	
		10′ Offset	11′ Offset	12′ Offset	On a Taper	On a Tangent
30	$L=\frac{WS^2}{60}$	150′	165′	180′	30′	60′
35		205′	225′	245′	35′	70′
40		265′	295′	320′	40′	80′
45	L = WS	450′	495′	540′	45′	90′
50		500′	550′	600′	50′	100′
55		550′	605′	660′	55′	110′
60		600′	660′	720′	60′	120′
65		650′	715′	780′	65′	130′
70		700′	770′	840′	70′	140′
75		750′	825′	900′	75′	150′
80		800′	880′	960′	80′	160′

✳✳ Taper lengths have been rounded off.
L=Length of Taper (FT.) W=Width of Offset (FT.)
S=Posted Speed (MPH)

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

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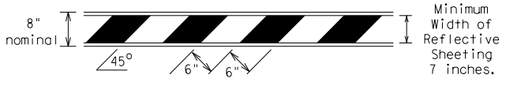
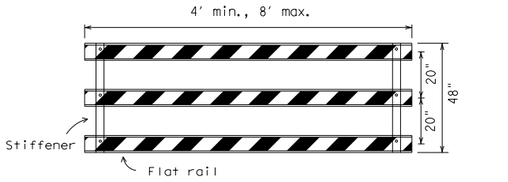
TYPE 3 BARRICADES

1. Refer to the Compliant Work Zone Traffic Control Devices List (CWZTCD) for details of the Type 3 Barricades and a list of all materials used in the construction of Type 3 Barricades.
2. Type 3 Barricades shall be used at each end of construction projects closed to all traffic.
3. Barricades extending across a roadway should have stripes that slope downward in the direction toward which traffic must turn in detouring. When both right and left turns are provided, the chevron striping may slope downward in both directions from the center of the barricade. Where no turns are provided at a closed road, striping should slope downward in both directions toward the center of roadway.
4. Striping of rails, for the right side of the roadway, should slope downward to the left. For the left side of the roadway, striping should slope downward to the right.
5. Identification markings may be shown only on the back of the barricade rails. The maximum height of letters and/or company logos used for identification shall be 1".
6. Barricades shall not be placed parallel to traffic unless an adequate clear zone is provided.
7. Warning lights shall NOT be installed on barricades.
8. Where barricades require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand is recommended. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight. Sand bags shall not be stacked in a manner that covers any portion of a barricade rails reflective sheeting. Rock, concrete, iron, steel or other solid objects will NOT be permitted. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall not be used for sandbags. Sandbags shall only be placed along or upon the base supports of the device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners.
9. Sheeting for barricades shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300 unless otherwise noted.

Barricades shall NOT be used as a sign support.



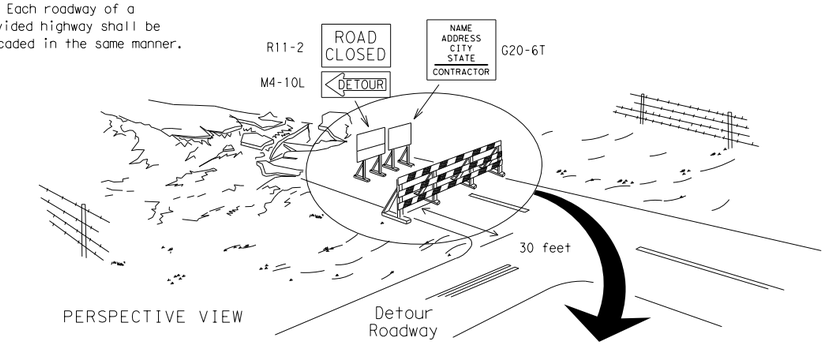
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



Stiffener may be inside or outside of support, but no more than 2 stiffeners shall be allowed on one barricade.

TYPICAL PANEL DETAIL
FOR SKID OR POST TYPE BARRICADES

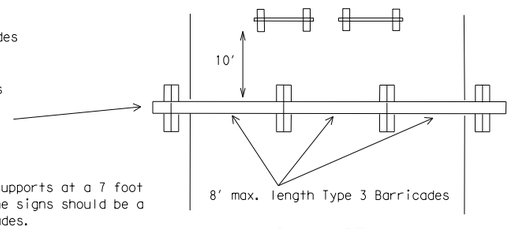
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.

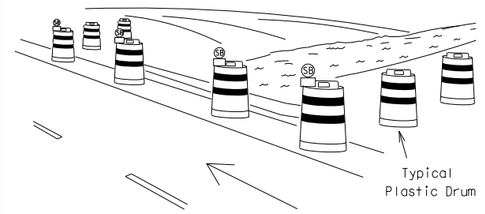
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

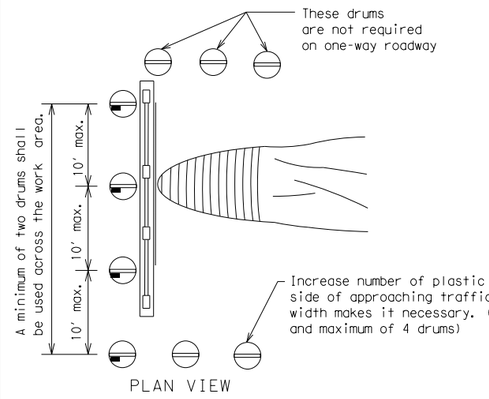
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

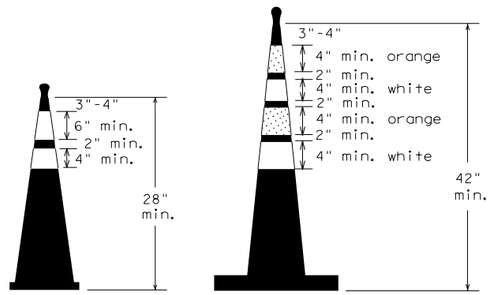
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder width is greater than 12 feet, steady-burn lights may be omitted if drums are used.
5. Drums must extend the length of the culvert widening.



PLAN VIEW

LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
SB	Steady burn warning light or yellow warning reflector

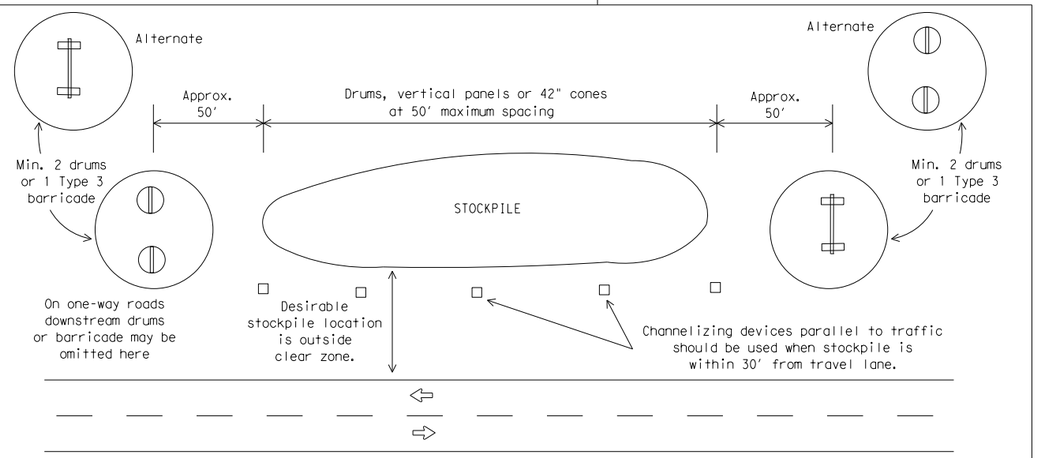
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



28" Cones shall have a minimum weight of 9 1/2 lbs.

42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

1. Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
2. One-piece cones have the body and base of the cone molded in one consolidated unit. Two-piece cones have a cone shaped body and a separate rubber base, or ballast, that is added to keep the device upright and in place.
3. Two-piece cones may have a handle or loop extending up to 8" above the minimum height shown, in order to aid in retrieving the device.
4. Cones or tubular markers shall have white or white and orange reflective bands as shown above. The reflective bands shall have a smooth, sealed outer surface and meet the requirements of Departmental Material Specification DMS-8300 Type A or Type B.
5. 28" cones and tubular markers are generally suitable for short duration and short-term stationary work as defined on BC(4). These should not be used for intermediate-term or long-term stationary work unless personnel is on-site to maintain them in their proper upright position.
6. 42" two-piece cones, vertical panels or drums are suitable for all work zone durations.
7. Cones or tubular markers used on each project should be of the same size and shape.



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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Texas Department of Transportation

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

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FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0073	02	088,ETC	US 281
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	BEXAR		31

104

DATE: 3/19/2024 9:37:11 PM
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WORK ZONE PAVEMENT MARKINGS

GENERAL

1. The Contractor shall be responsible for maintaining work zone and existing pavement markings, in accordance with the standard specifications and special provisions, on all roadways open to traffic within the CSJ limits unless otherwise stated in the plans.
2. Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
3. Additional supplemental pavement marking details may be found in the plans or specifications.
4. Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
5. When short term markings are required on the plans, short term markings shall conform with the TMUTCD, the plans and details as shown on the Standard Plan Sheet WZ(STPM).
6. When standard pavement markings are not in place and the roadway is opened to traffic, DO NOT PASS signs shall be erected to mark the beginning of the sections where passing is prohibited and PASS WITH CARE signs at the beginning of sections where passing is permitted.
7. All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

RAISED PAVEMENT MARKERS

1. Raised pavement markers are to be placed according to the patterns on BC(12).
2. All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and Departmental Material Specification DMS-4200 or DMS-4300.

PREFABRICATED PAVEMENT MARKINGS

1. Removable prefabricated pavement markings shall meet the requirements of DMS-8241.
2. Non-removable prefabricated pavement markings (foil back) shall meet the requirements of DMS-8240.

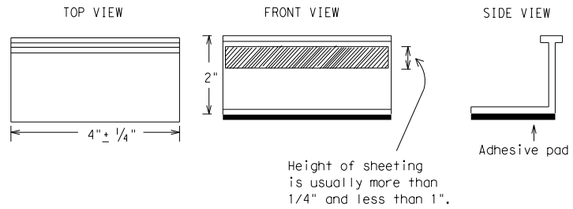
MAINTAINING WORK ZONE PAVEMENT MARKINGS

1. The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
2. Work zone pavement markings shall be inspected in accordance with the frequency and reporting requirements of work zone traffic control device inspections as required by Form 599.
3. The markings should provide a visible reference for a minimum distance of 300 feet during normal daylight hours and 160 feet when illuminated by automobile low-beam headlights at night, unless sight distance is restricted by roadway geometrics.
4. Markings failing to meet this criteria within the first 30 days after placement shall be replaced at the expense of the Contractor as per Specification Item 662.

REMOVAL OF PAVEMENT MARKINGS

1. Pavement markings that are no longer applicable, could create confusion or direct a motorist toward or into the closed portion of the roadway shall be removed or obliterated before the roadway is opened to traffic.
2. The above shall not apply to detours in place for less than three days, where flaggers and/or sufficient channelizing devices are used in lieu of markings to outline the detour route.
3. Pavement markings shall be removed to the fullest extent possible, so as not to leave a discernable marking. This shall be by any method approved by TxDOT Specification Item 677 for "Eliminating Existing Pavement Markings and Markers".
4. The removal of pavement markings may require resurfacing or seal coating portions of the roadway as described in Item 677.
5. Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used.
6. Blast cleaning may be used but will not be required unless specifically shown in the plans.
7. Over-painting of the markings SHALL NOT BE permitted.
8. Removal of raised pavement markers shall be as directed by the Engineer.
9. Removal of existing pavement markings and markers will be paid for directly in accordance with Item 677, "ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS," unless otherwise stated in the plans.
10. Black-out marking tape may be used to cover conflicting existing markings for periods less than two weeks when approved by the Engineer.

Temporary Flexible-Reflective Roadway Marker Tabs



STAPLES OR NAILS SHALL NOT BE USED TO SECURE TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS TO THE PAVEMENT SURFACE

1. Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
2. Tabs detailed on this sheet are to be inspected and accepted by the Engineer or designated representative. Sampling and testing is not normally required, however at the option of the Engineer, either "A" or "B" below may be imposed to assure quality before placement on the roadway.
   A. Select five (5) or more tabs at random from each lot or shipment and submit to the Construction Division, Materials and Pavement Section to determine specification compliance.
   B. Select five (5) tabs and perform the following test. Affix five (5) tabs at 24 inch intervals on an asphaltic pavement in a straight line. Using a medium size passenger vehicle or pickup, run over the markers with the front and rear tires at a speed of 35 to 40 miles per hour, four (4) times in each direction. No more than one (1) out of the five (5) reflective surfaces shall be lost or displaced as a result of this test.
3. Small design variances may be noted between tab manufacturers.
4. See Standard Sheet WZ(STPM) for tab placement on new pavements. See Standard Sheet TCP(7-1) for tab placement on seal coat work.

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

1. Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
2. All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
3. Adhesive for guidemarks shall be bituminous material hot applied or butyl rubber pad for all surfaces, or thermoplastic for concrete surfaces.

Guidemarks shall be designated as:
YELLOW - (two amber reflective surfaces with yellow body).
WHITE - (one silver reflective surface with white body).

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
TRAFFIC BUTTONS	DMS-4300
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY REMOVABLE, PREFABRICATED PAVEMENT MARKINGS	DMS-8241
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS	DMS-8242

A list of prequalified reflective raised pavement markers, non-reflective traffic buttons, roadway marker tabs and other pavement markings can be found at the Material Producer List web address shown on BC(1).

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-98 9-07 5-21 1-02 7-13 11-02 8-14	0073	02	088,ETC	US 281
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		32

DATE: 3/19/2024 9:37:12 PM
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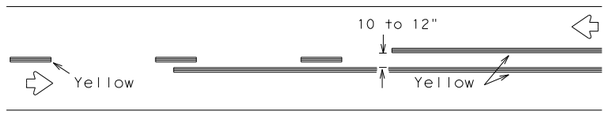
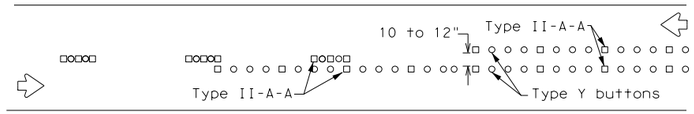
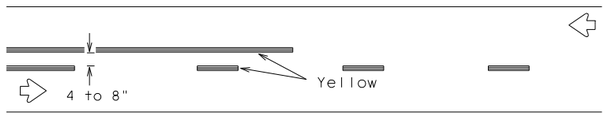
PAVEMENT MARKING PATTERNS



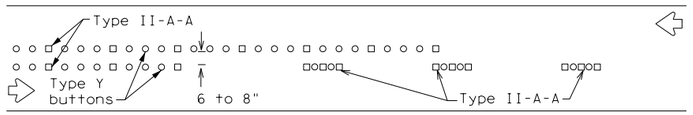
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



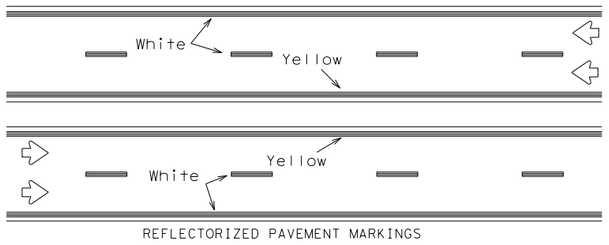
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



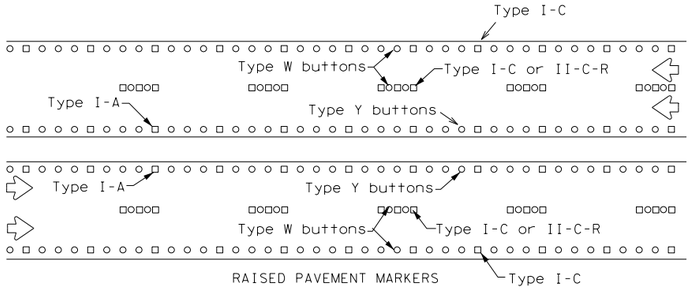
RAISED PAVEMENT MARKERS - PATTERN B

Pattern A is the TXDOT Standard, however Pattern B may be used if approved by the Engineer.
Prefabricated markings may be substituted for reflectorized pavement markings.

CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO-LANE, TWO-WAY HIGHWAYS



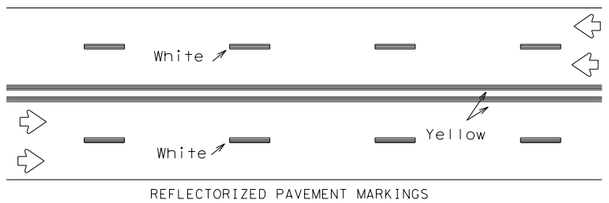
REFLECTORIZED PAVEMENT MARKINGS



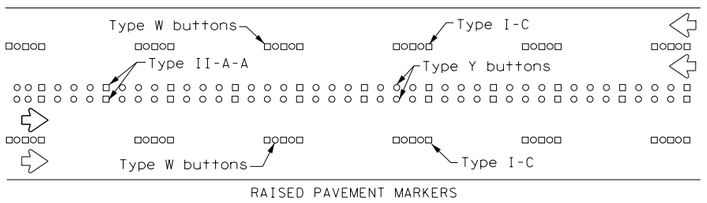
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



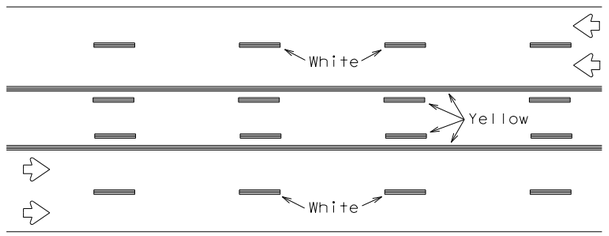
REFLECTORIZED PAVEMENT MARKINGS



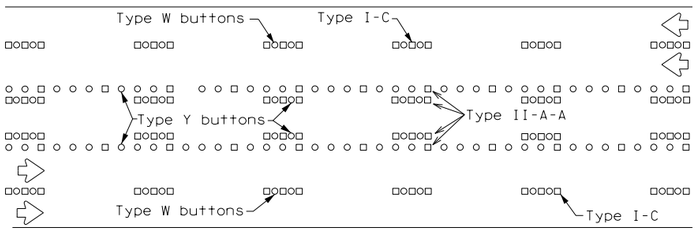
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

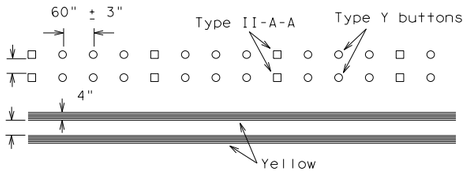
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

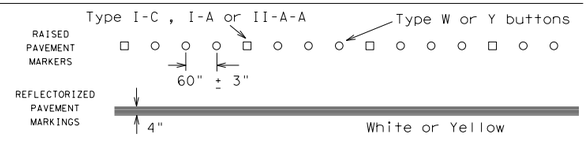
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

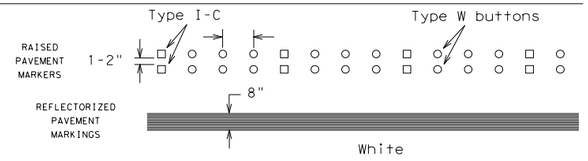


EDGE LINE OR SINGLE NO-PASSING LINE



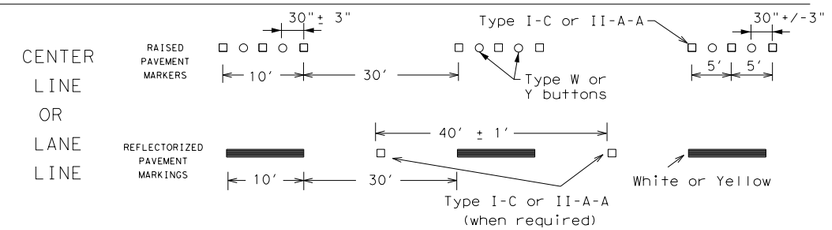
WIDE LINE

(FOR LEFT TURN CHANNELIZING LINE OR CHANNELIZING LINE USED TO DISCOURAGE LANE CHANGING.)

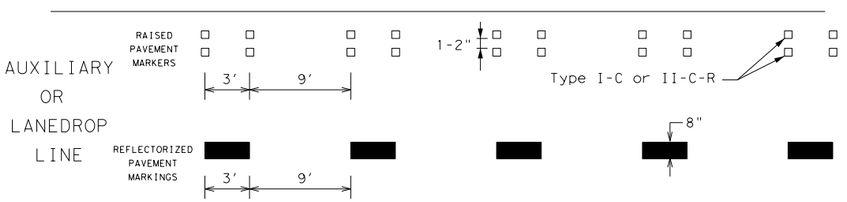


BROKEN LINES

CENTER LINE OR LANE LINE

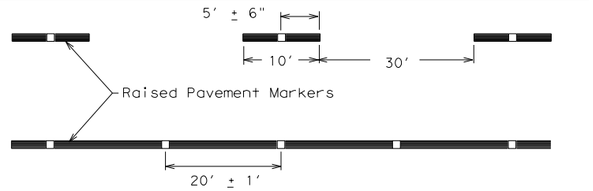


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

If raised pavement markers are used to supplement REMOVABLE markings, the markers shall be applied to the top of the tape at the approximate mid length of tape used for broken lines or at 20 foot spacing for solid lines. This allows an easier removal of raised pavement markers and tape.



Centerline only - not to be used on edge lines

Raised pavement markers used as standard pavement markings shall be from the approved products list and meet the requirements of Item 672 "RAISED PAVEMENT MARKERS."

Texas Department of Transportation

Traffic Safety Division Standard

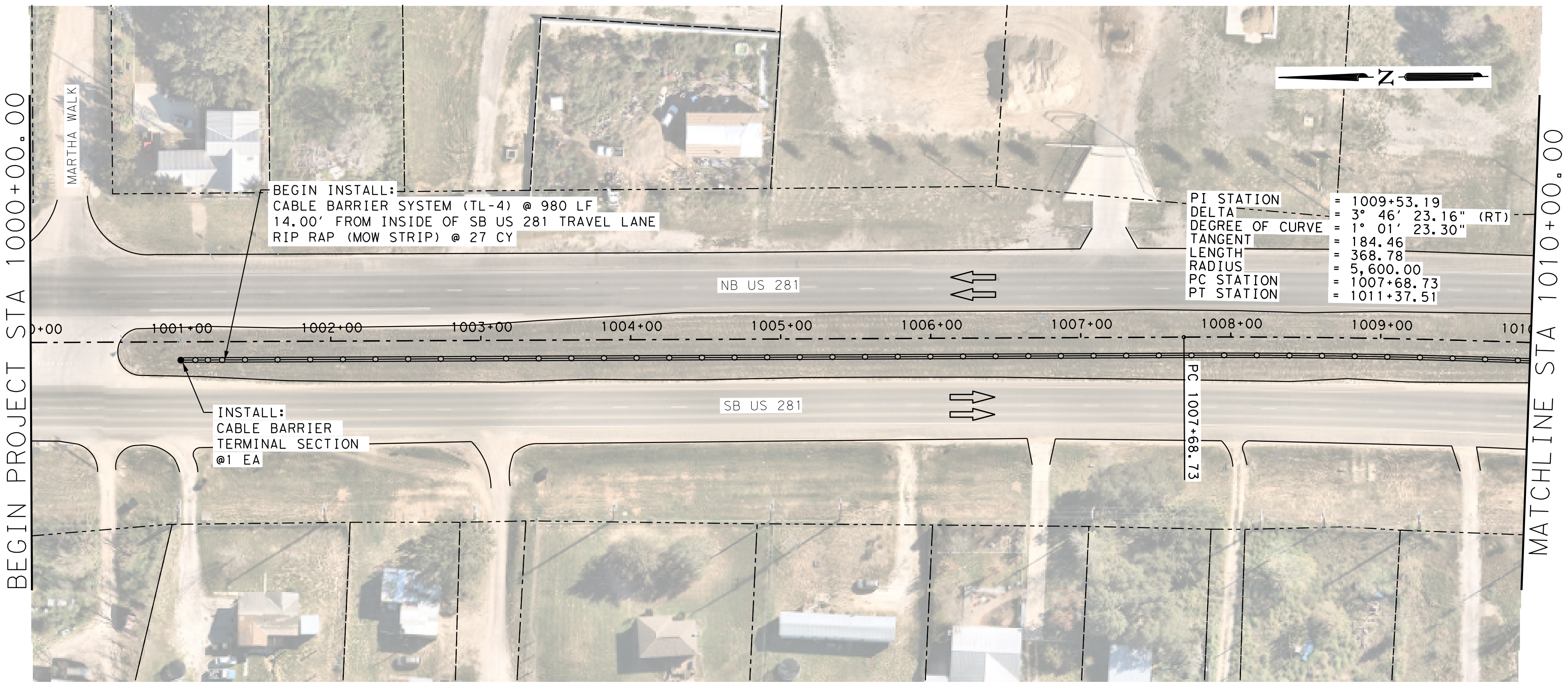
BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	0073	02	088,ETC	US 281
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		33

ITEM	DESCRIPTION	UNIT	QTY
0132-6021	EMBANKMENT (VEHICLE)(ORD COMP)(TY C)	CY	11
0150-6002	BLADING	HR	8.0
0164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	1056
0164-6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	1056
0168-6001	VEGETATIVE WATERING	MG	16.47
0169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	1056
0432-6066	RIPRAP (CL A) (MOW STRIP) (3 IN)	CY	44
0543-6002	CABLE BARRIER SYSTEM (TL-4)	LF	1584
0543-6020	CABLE BARRIER TERMINAL SECTION (TL-4)	EA	3

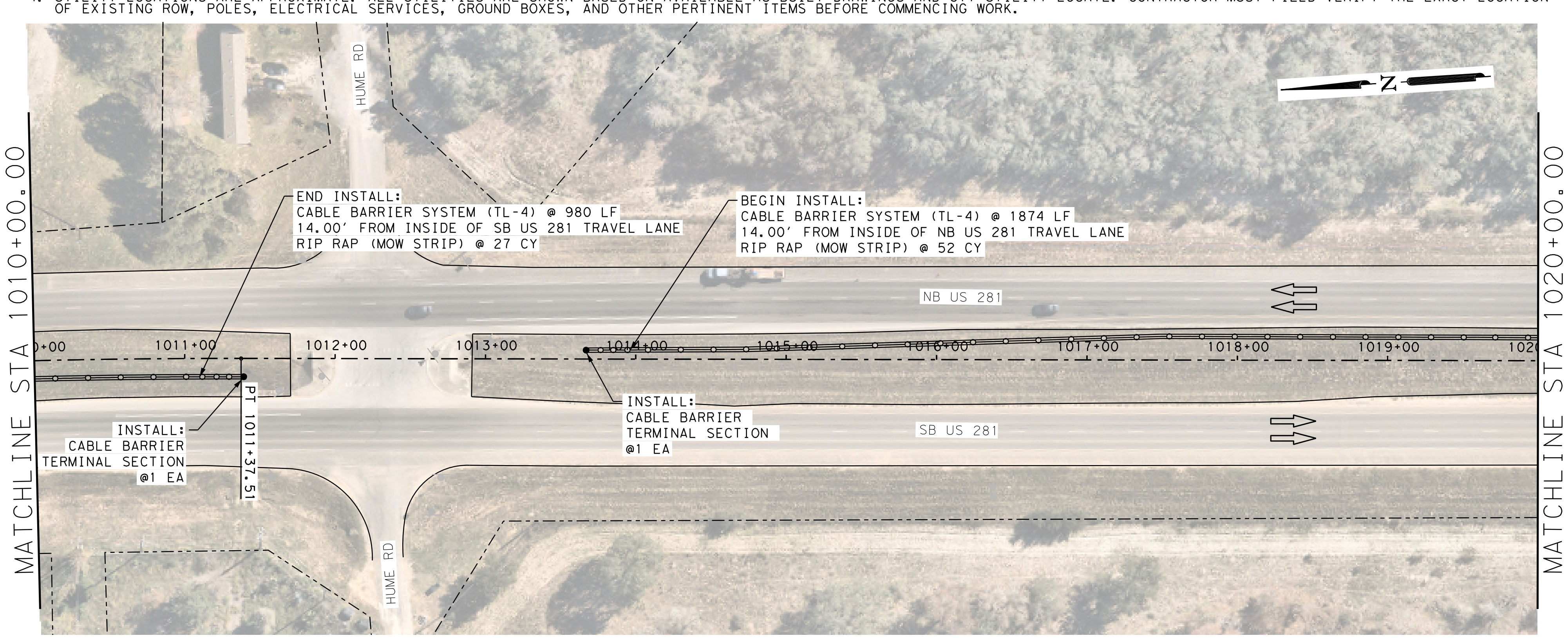
Plotted on: 3/19/2024



LEGEND

OH E	EXIST OVERHEAD ELECTRIC LINE
OH C	EXIST OVERHEAD COMMUNICATION LINE
	EXIST DRAINAGE STRUCTURE
	APPARENT R.O.W.
	PROPOSED CABLE BARRIER FENCE WITH 3' MOW STRIP
	TL-4 CABLE BARRIER TERMINAL
	TEMP SEDMT CONT FENCE
	TRAFFIC FLOW ARROWS

NOTES:
1. ALL RIGHT-OF-WAY LINES ARE APPROXIMATE. VERIFY LOCATIONS AS NECESSARY
2. CABLE BARRIERS ARE DESIGNED TO BE PLACED ON 6:1 (16.67%) OR FLATTER SIDE SLOPES. TOPOGRAPHICAL SURVEYING WAS NOT PERFORMED ON THIS PROJECT. BASELINE COINCIDENCES WITH THE FLOWLINE OF DITCH. CABLE BARRIER LOCATIONS MAY BE ADJUSTED AS NEEDED TO FIT FIELD CONDITIONS AS DIRECTED BY THE ENGINEER.
3. CABLE BARRIERS SHALL BE PLACED WITH AT LEAST 12 FEET OFFSET FROM EDGE OF THE TRAVEL LANE. CABLE BARRIERS SHALL BE PLACED AT LEAST 8 FEET FROM THE BOTTOM OF THE DITCHLINE. OFFSET OF AT LEAST 5 FEET FROM THE EDGE OF ILLUMINATION POLE IS RECCOMMENDED.
4. UTILITY LOCATIONS ARE APPROXIMATE. ALL UTILITIES ARE SHOWN BASED ON AVAILABLE AS-BUILT DRAWINGS AND 811 UTILITY LOCATE. CONTRACTOR MUST FIELD VERIFY THE EXACT LOCATION OF EXISTING ROW, POLES, ELECTRICAL SERVICES, GROUND BOXES, AND OTHER PERTINENT ITEMS BEFORE COMMENCING WORK.



NOTES CONTINUED:
5. THE CONTRACTOR MUST COORDINATE WITH THE UTILITY COMPANIES TO VERIFY THE LOCATION OF EXISTING OVERHEAD AND UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION TO AVOID CONFLICTS WITH, OR DAMAGE TO, THESE UTILITIES.
6. STATIONING IS NOT TRUE IDENTIFICATION OF THE ROADWAY ALIGNMENT. NO TOPOGRAPHIC FILE WAS USED AS A BASIS FOR STATIONING.
7. CONTRACTOR SHALL INSTALL TEMPORARY SEDIMENT CONTROL FENCES AS NEEDED (NOT SHOWN ON PLANS)
8. MOW STRIP SHALL BE 36 INCHES WIDE UNLESS OTHERWISE SPECIFIED BE THE ENGINEER.
9. DRILL SEEDING AND SOIL RETENTION BLANKETS SHALL BE APPLIED AT A MINIMUM OF 3 FEET ON EITHER SIDE OF CABLE BARRIER MOW STRIP FOR A TOTAL WIDTH OF 6 FEET.
10. NO WORK THAT COULD HAVE AN IMPACT TO THE EXISTING FEMA 100YR WSEL IS BEING PROPOSED FOR THIS PROJECT.
11. FPA NOTIFICATION FOR ATASCOSA COUNTY WAS SUBMITTED IN WRITING ON MARCH,19,2024.

DESIGN
STATE OF TEXAS — JUSTIN W. CLARK — 118715 — LICENSED PROFESSIONAL ENGINEER
JUSTIN W. CLARK, P.E. — 3/19/2024 — DATE

APPROVAL
STATE OF TEXAS — GILMER D. GASTON — 80472 — LICENSED PROFESSIONAL ENGINEER
GILMER D. GASTON, P.E. — 3/19/2024 — DATE

0 50 100 150
SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

Texas Department of Transportation

US 281: CABLE BARRIER

PROPOSED CABLE BARRIER LAYOUT

STA 1000+00 TO STA 1020+00

SHEET 1 OF 34

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	34

Design Filename: P:\122\96\02\Tasks\13_US 281 Cable Barrier\Design\Civil\Roadway\1229502_13_RDWY1.dgn

Plotted on: 3/19/2024

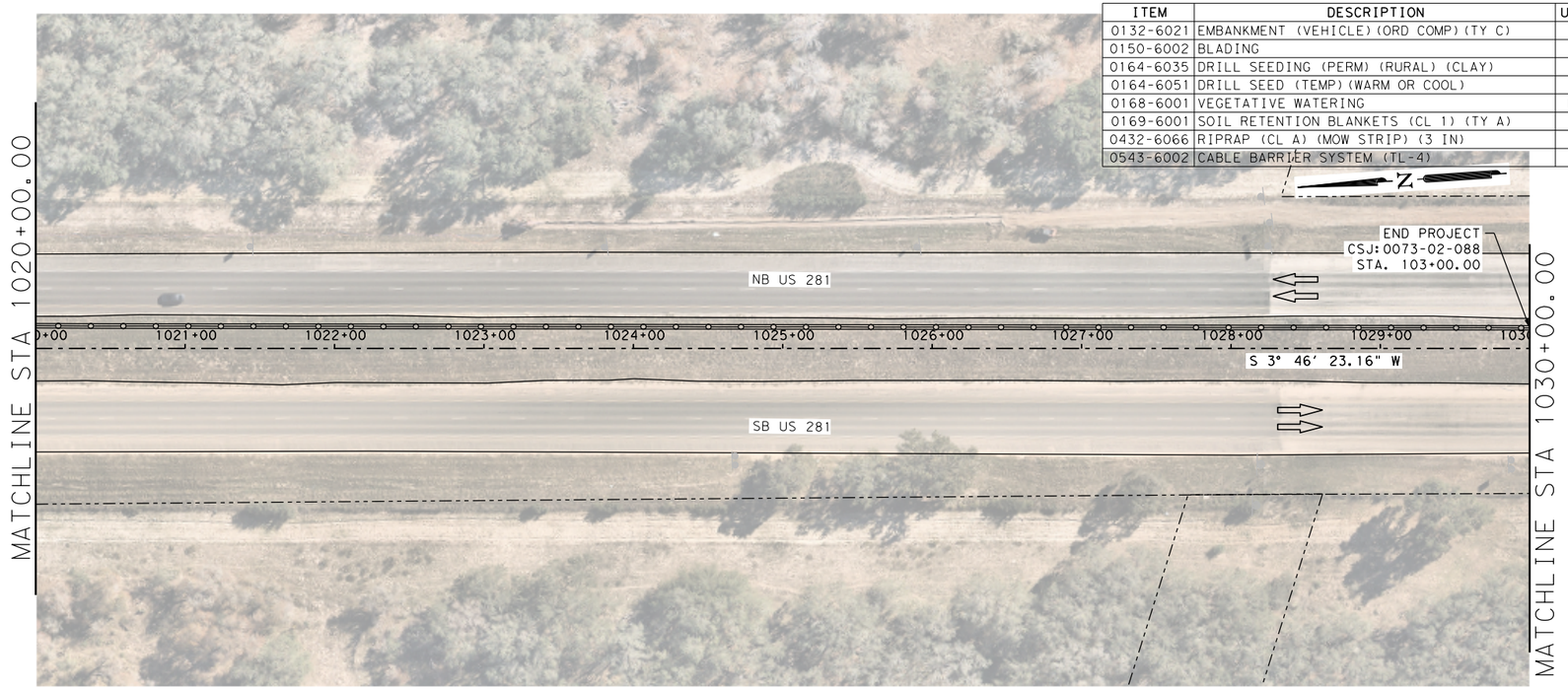
Design Filename: P:\122\96\02\Tasks\13_US 281 Cable Barrier\Design\Civil\Roadway\1229502_13_RDWY2.dgn

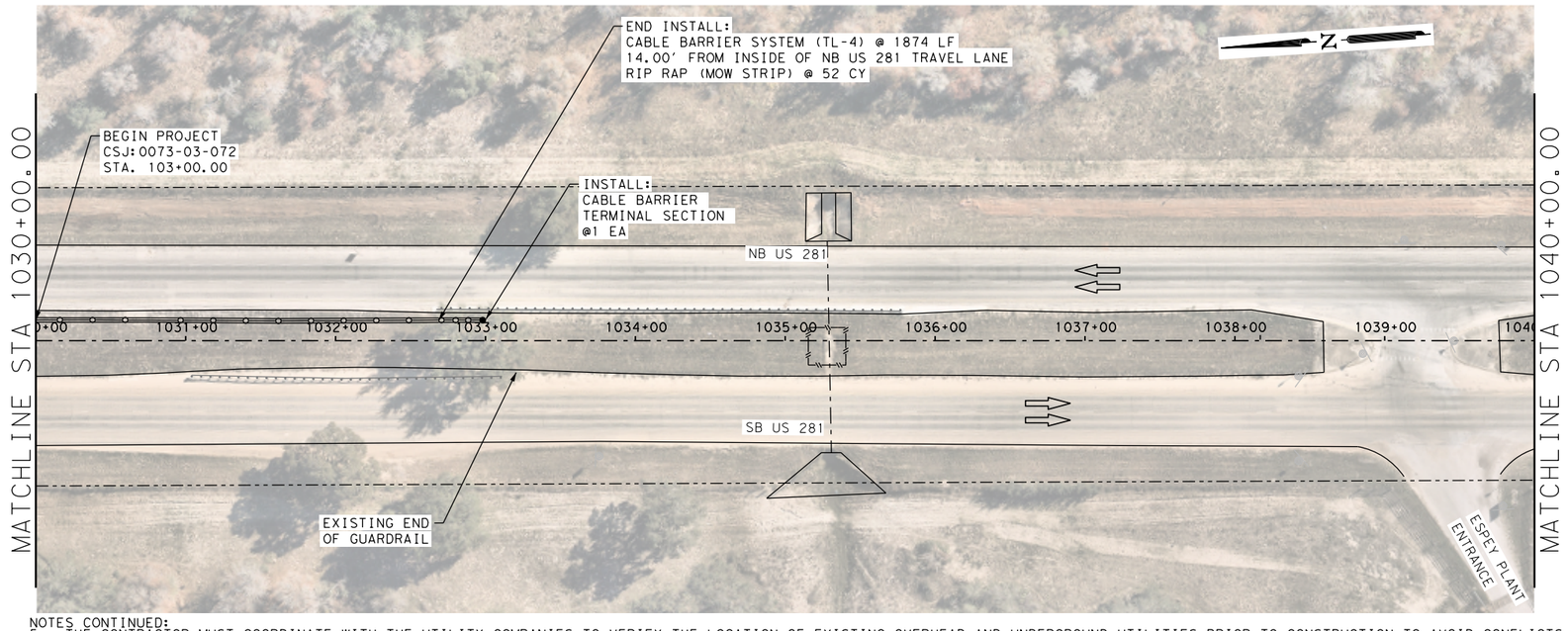
CSJ: 0073-02-088 1020+00 TO 1030+00

ITEM	DESCRIPTION	UNIT	QTY
0132-6021	EMBANKMENT (VEHICLE)(ORD COMP)(TY C)	CY	7
0150-6002	BLADING	HR	5.0
0164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	667
0164-6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	667
0168-6001	VEGETATIVE WATERING	MG	10.41
0169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	667
0432-6066	RIPRAP (CL A) (MOW STRIP) (3 IN)	CY	28
0543-6002	CABLE BARRIER SYSTEM (TL-4)	LF	1000

CSJ: 0073-03-072 1030+00 TO 1040+00

ITEM	DESCRIPTION	UNIT	QTY
0132-6021	EMBANKMENT (VEHICLE)(ORD COMP)(TY C)	CY	2
0150-6002	BLADING	HR	3.0
0164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	180
0164-6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	180
0168-6001	VEGETATIVE WATERING	MG	2.81
0169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	180
0432-6066	RIPRAP (CL A) (MOW STRIP) (3 IN)	CY	8
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	100
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	100
0543-6002	CABLE BARRIER SYSTEM (TL-4)	LF	270
0543-6020	CABLE BARRIER TERMINAL SECTION (TL-4)	EA	1





NOTES:
1. ALL RIGHT-OF-WAY LINES ARE APPROXIMATE. VERIFY LOCATIONS AS NECESSARY
2. CABLE BARRIERS ARE DESIGNED TO BE PLACED ON 6:1 (16.67%) OR FLATTER SIDE SLOPES. TOPOGRAPHICAL SURVEYING WAS NOT PERFORMED ON THIS PROJECT. BASELINE COINCIDENCES WITH THE FLOWLINE OF DITCH. CABLE BARRIER LOCATIONS MAY BE ADJUSTED AS NEEDED TO FIT FIELD CONDITIONS AS DIRECTED BY THE ENGINEER.
3. CABLE BARRIERS SHALL BE PLACED WITH AT LEAST 12 FEET OFFSET FROM EDGE OF THE TRAVEL LANE. CABLE BARRIERS SHALL BE PLACED AT LEAST 8 FEET FROM THE BOTTOM OF THE DITCHLINE. OFFSET OF AT LEAST 5 FEET FROM THE EDGE OF ILLUMINATION POLE IS RECCOMMENDED.
4. UTILITY LOCATIONS ARE APPROXIMATE. ALL UTILITIES ARE SHOWN BASED ON AVAILABLE AS-BUILT DRAWINGS AND 811 UTILITY LOCATE. CONTRACTOR MUST FIELD VERIFY THE EXACT LOCATION OF EXISTING ROW, POLES, ELECTRICAL SERVICES, GROUND BOXES, AND OTHER PERTINENT ITEMS BEFORE COMMENCING WORK.

NOTES CONTINUED:
5. THE CONTRACTOR MUST COORDINATE WITH THE UTILITY COMPANIES TO VERIFY THE LOCATION OF EXISTING OVERHEAD AND UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION TO AVOID CONFLICTS WITH, OR DAMAGE TO, THESE UTILITIES.
6. STATIONING IS NOT TRUE IDENTIFICATION OF THE ROADWAY ALIGNMENT. NO TOPOGRAPHIC FILE WAS USED AS A BASIS FOR STATIONING.
7. CONTRACTOR SHALL INSTALL TEMPORARY SEDIMENT CONTROL FENCES AS NEEDED (NOT SHOWN ON PLANS)
8. MOW STRIP SHALL BE 36 INCHES WIDE UNLESS OTHERWISE SPECIFIED BE THE ENGINEER.
9. DRILL SEEDING AND SOIL RETENTION BLANKETS SHALL BE APPLIED AT A MINIMUM OF 3 FEET ON EITHER SIDE OF CABLE BARRIER MOW STRIP FOR A TOTAL WIDTH OF 6 FEET.
10. NO WORK THAT COULD HAVE AN IMPACT TO THE EXISTING FEMA 100YR WSEL IS BEING PROPOSED FOR THIS PROJECT.
11. FPA NOTIFICATION FOR ATASCOSA COUNTY WAS SUBMITTED IN WRITING ON MARCH, 19, 2024.

LEGEND

- OH E — EXIST OVERHEAD ELECTRIC LINE
- OH C — EXIST OVERHEAD COMMUNICATION LINE
- EXIST DRAINAGE STRUCTURE
- APPARENT R.O.W.
- PROPOSED CABLE BARRIER FENCE WITH 3' MOW STRIP
- TL-4 CABLE BARRIER TERMINAL
- TEMP SEDMT CONT FENCE
- TRAFFIC FLOW ARROWS

DESIGN

STATE OF TEXAS — JUSTIN W. CLARK — 118715 — LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 3/19/2024 DATE

APPROVAL

STATE OF TEXAS — GILMER D. GASTON — 80472 — LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 3/19/2024 DATE

0 50 100 150

SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

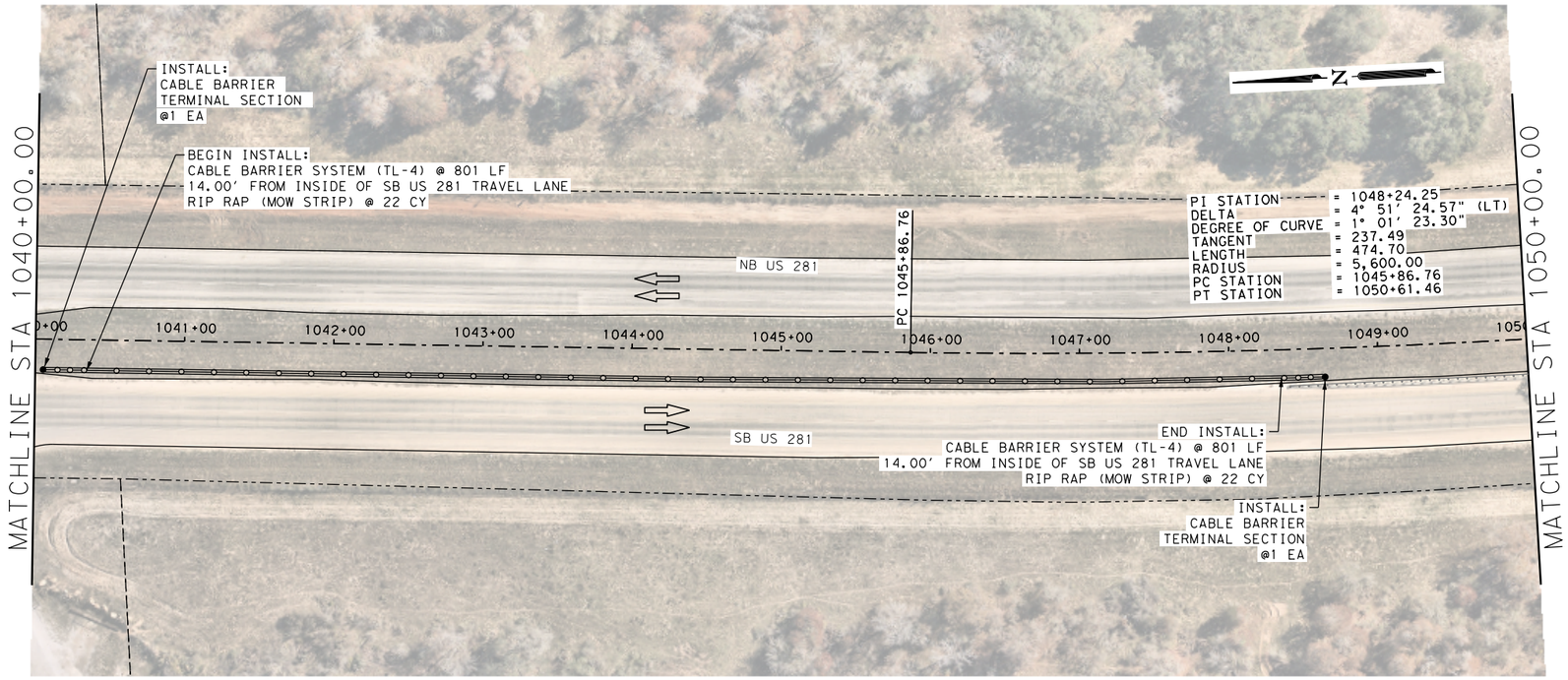
US 281: CABLE BARRIER

PROPOSED CABLE BARRIER LAYOUT

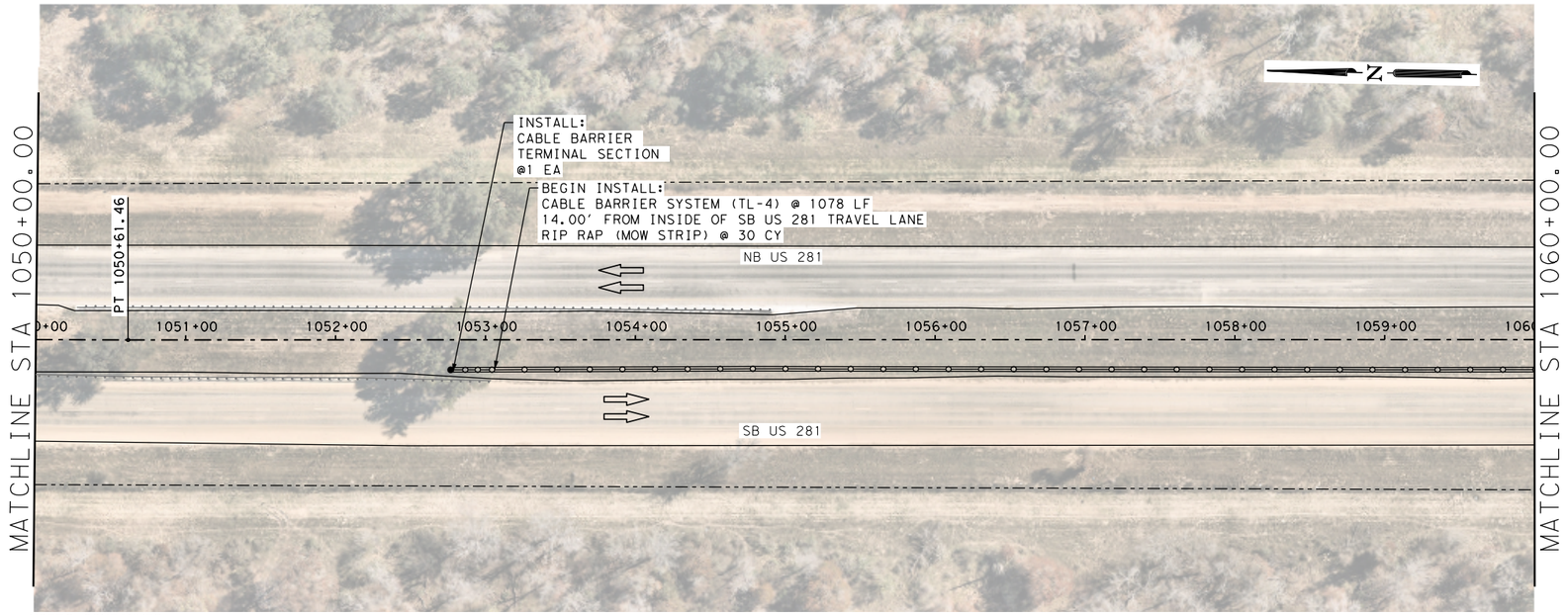
STA 1020+00 TO STA 1040+00

SHEET 2 OF 34

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088, ETC	35



NOTES:
1. ALL RIGHT-OF-WAY LINES ARE APPROXIMATE. VERIFY LOCATIONS AS NECESSARY
2. CABLE BARRIERS ARE DESIGNED TO BE PLACED ON 6:1 (16.67%) OR FLATTER SIDE SLOPES. TOPOGRAPHICAL SURVEYING WAS NOT PERFORMED ON THIS PROJECT. BASELINE COINCIDENCES WITH THE FLOWLINE OF DITCH. CABLE BARRIER LOCATIONS MAY BE ADJUSTED AS NEEDED TO FIT FIELD CONDITIONS AS DIRECTED BY THE ENGINEER.
3. CABLE BARRIERS SHALL BE PLACED WITH AT LEAST 12 FEET OFFSET FROM EDGE OF THE TRAVEL LANE. CABLE BARRIERS SHALL BE PLACED AT LEAST 8 FEET FROM THE BOTTOM OF THE DITCHLINE. OFFSET OF AT LEAST 5 FEET FROM THE EDGE OF ILLUMINATION POLE IS RECCOMMENDED.
4. UTILITY LOCATIONS ARE APPROXIMATE. ALL UTILITIES ARE SHOWN BASED ON AVAILABLE AS-BUILT DRAWINGS AND 811 UTILITY LOCATE. CONTRACTOR MUST FIELD VERIFY THE EXACT LOCATION OF EXISTING ROW, POLES, ELECTRICAL SERVICES, GROUND BOXES, AND OTHER PERTINENT ITEMS BEFORE COMMENCING WORK.



NOTES CONTINUED:
5. THE CONTRACTOR MUST COORDINATE WITH THE UTILITY COMPANIES TO VERIFY THE LOCATION OF EXISTING OVERHEAD AND UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION TO AVOID CONFLICTS WITH, OR DAMAGE TO, THESE UTILITIES.
6. STATIONING IS NOT TRUE IDENTIFICATION OF THE ROADWAY ALIGNMENT. NO TOPOGRAPHIC FILE WAS USED AS A BASIS FOR STATIONING.
7. CONTRACTOR SHALL INSTALL TEMPORARY SEDIMENT CONTROL FENCES AS NEEDED (NOT SHOWN ON PLANS)
8. MOW STRIP SHALL BE 36 INCHES WIDE UNLESS OTHERWISE SPECIFIED BE THE ENGINEER.
9. DRILL SEEDING AND SOIL RETENTION BLANKETS SHALL BE APPLIED AT A MINIMUM OF 3 FEET ON EITHER SIDE OF CABLE BARRIER MOW STRIP FOR A TOTAL WIDTH OF 6 FEET.
10. NO WORK THAT COULD HAVE AN IMPACT TO THE EXISTING FEMA 100YR WSEL IS BEING PROPOSED FOR THIS PROJECT.
11. FPA NOTIFICATION FOR ATASCOSA COUNTY WAS SUBMITTED IN WRITING ON MARCH,19,2024.

ITEM	DESCRIPTION	UNIT	QTY
0132-6021	EMBANKMENT (VEHICLE)(ORD COMP)(TY C)	CY	11
0150-6002	BLADING	HR	8.0
0164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	997
0164-6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	997
0168-6001	VEGETATIVE WATERING	MG	15.55
0169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	997
0432-6066	RIPRAP (CL A) (MOW STRIP) (3 IN)	CY	42
0543-6002	CABLE BARRIER SYSTEM (TL-4)	LF	1495
0543-6020	CABLE BARRIER TERMINAL SECTION (TL-4)	EA	3

LEGEND

- OH E — EXIST OVERHEAD ELECTRIC LINE
- OH C — EXIST OVERHEAD COMMUNICATION LINE
- EXIST DRAINAGE STRUCTURE
- APPARENT R.O.W.
- PROPOSED CABLE BARRIER FENCE WITH 3' MOW STRIP
- TL-4 CABLE BARRIER TERMINAL
- TEMP SEDMT CONT FENCE
- TRAFFIC FLOW ARROWS

DESIGN

STATE OF TEXAS — JUSTIN W. CLARK — 118715 — LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 3/19/2024 DATE

APPROVAL

STATE OF TEXAS — GILMER D. GASTON — 80472 — LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 3/19/2024 DATE

0 50 100 150

SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028800

US 281: CABLE BARRIER

PROPOSED CABLE BARRIER LAYOUT

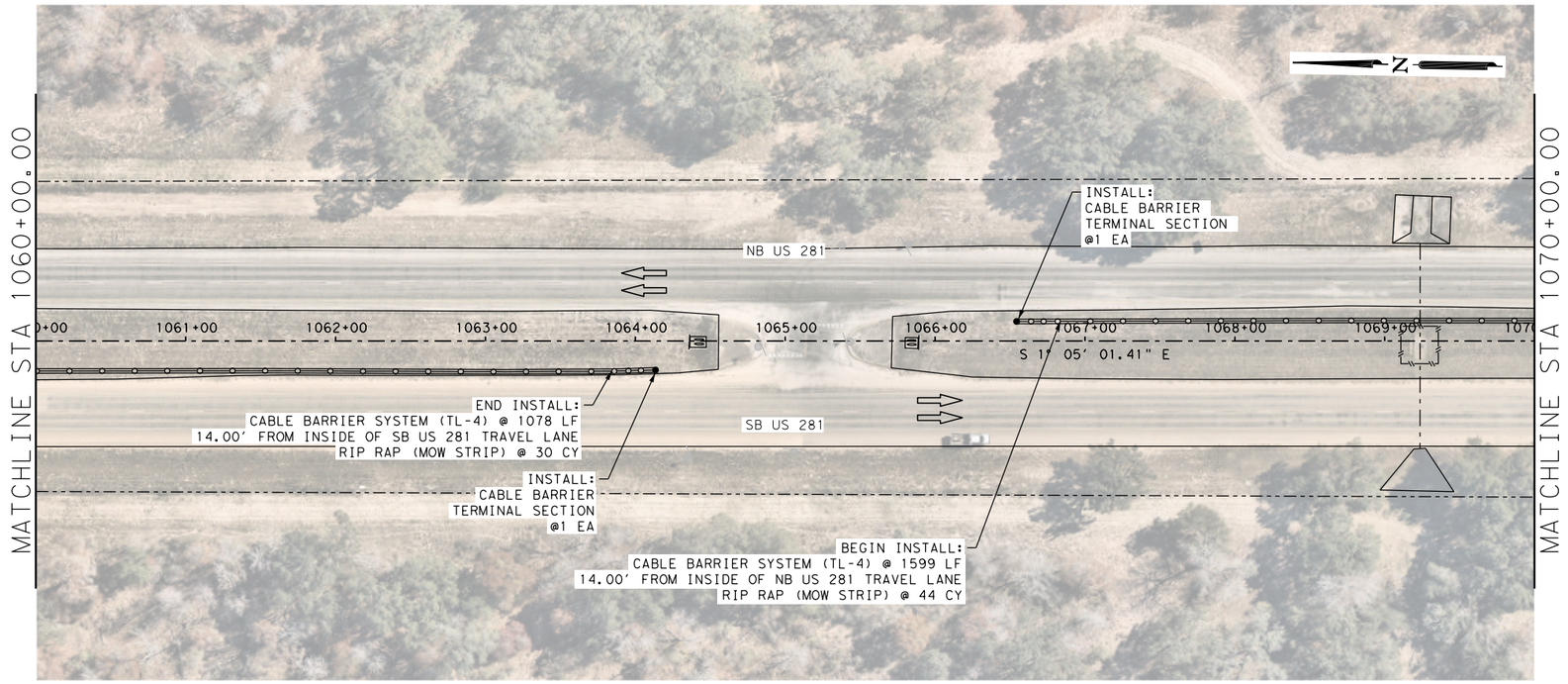
STA 1040+00 TO STA 1060+00

SHEET 3 OF 34

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	36

Plotted on: 3/19/2024

Design Filename: P:\122\96\02\Tasks\13_US 281 Cable Barrier\Design\Civil\Roadway\1229502_13_RDWY3.dgn



NOTES:
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NOTES CONTINUED:
5. THE CONTRACTOR MUST COORDINATE WITH THE UTILITY COMPANIES TO VERIFY THE LOCATION OF EXISTING OVERHEAD AND UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION TO AVOID CONFLICTS WITH, OR DAMAGE TO, THESE UTILITIES.
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11. FPA NOTIFICATION FOR ATASCOSA COUNTY WAS SUBMITTED IN WRITING ON MARCH, 19, 2024.

ITEM	DESCRIPTION	UNIT	QTY
0132-6021	EMBANKMENT (VEHICLE)(ORD COMP)(TY C)	CY	12
0150-6002	BLADING	HR	9.0
0164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	1134
0164-6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	1134
0168-6001	VEGETATIVE WATERING	MG	17.69
0169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	1134
0432-6066	RIPRAP (CL A) (MOW STRIP) (3 IN)	CY	47
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	100
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	100
0506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	20
0506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	20
0543-6002	CABLE BARRIER SYSTEM (TL-4)	LF	1701
0543-6020	CABLE BARRIER TERMINAL SECTION (TL-4)	EA	2

LEGEND

- OH E — EXIST OVERHEAD ELECTRIC LINE
- OH C — EXIST OVERHEAD COMMUNICATION LINE
- EXIST DRAINAGE STRUCTURE
- APPARENT R.O.W.
- PROPOSED CABLE BARRIER FENCE WITH 3' MOW STRIP
- TL-4 CABLE BARRIER TERMINAL
- TEMP SEDMT CONT FENCE
- TRAFFIC FLOW ARROWS

DESIGN

STATE OF TEXAS — JUSTIN W. CLARK — 118715 — LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 3/19/2024 DATE

APPROVAL

STATE OF TEXAS — GILMER D. GASTON — 80472 — LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 3/19/2024 DATE

0 50 100 150

SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

US 281: CABLE BARRIER

PROPOSED CABLE BARRIER LAYOUT

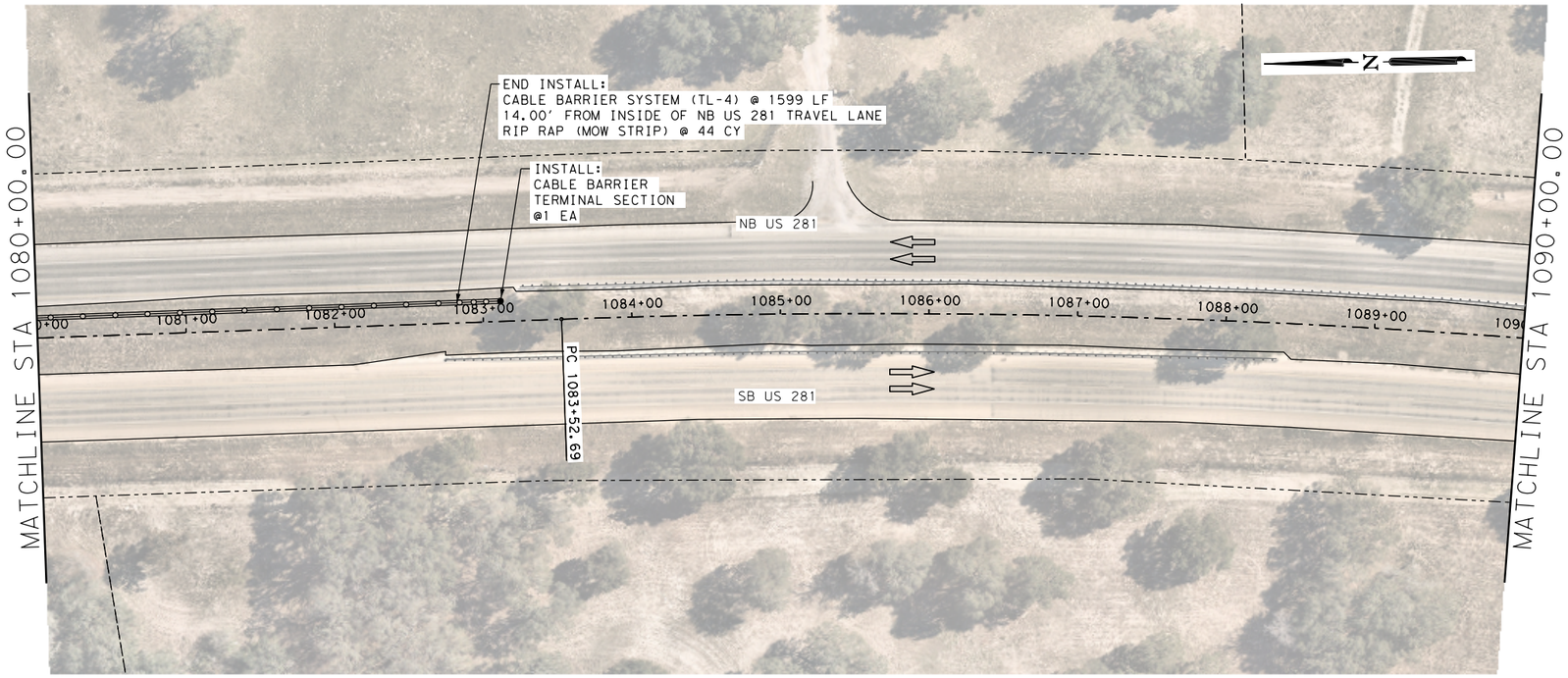
STA 1060+00 TO STA 1080+00

SHEET 4 OF 34

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	37

Plotted on: 3/19/2024

Design Filename: P:\122.96\02\Tasks\13_US 281 Cable Barrier\Design\Civil\Roadway\1229502_13_RDWY4.dgn



NOTES:
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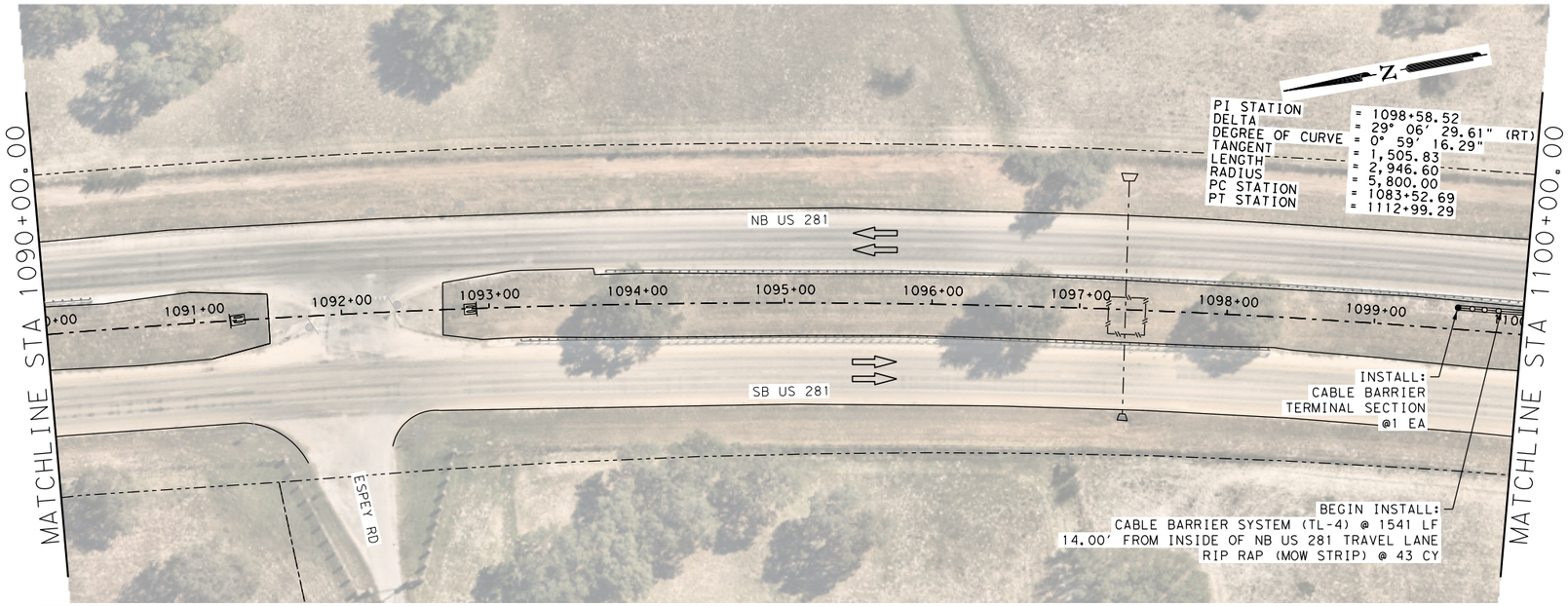
4. UTILITY LOCATIONS ARE APPROXIMATE. ALL UTILITIES ARE SHOWN BASED ON AVAILABLE AS-BUILT DRAWINGS AND 811 UTILITY LOCATE. CONTRACTOR MUST FIELD VERIFY THE EXACT LOCATION OF EXISTING ROW, POLES, ELECTRICAL SERVICES, GROUND BOXES, AND OTHER PERTINENT ITEMS BEFORE COMMENCING WORK.



NOTES CONTINUED:
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11. FPA NOTIFICATION FOR ATASCOSA COUNTY WAS SUBMITTED IN WRITING ON MARCH, 19, 2024.

ITEM	DESCRIPTION	UNIT	QTY
0132-6021	EMBANKMENT (VEHICLE)(ORD COMP)(TY C)	CY	2
0150-6002	BLADING	HR	2.0
0164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	199
0164-6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	199
0168-6001	VEGETATIVE WATERING	MG	3.10
0169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	199
0432-6066	RIPRAP (CL A) (MOW STRIP) (3 IN)	CY	8
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	100
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	100
0506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	20
0506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	20
0543-6002	CABLE BARRIER SYSTEM (TL-4)	LF	298
0543-6020	CABLE BARRIER TERMINAL SECTION (TL-4)	EA	2

LEGEND

- OH E — EXIST OVERHEAD ELECTRIC LINE
- OH C — EXIST OVERHEAD COMMUNICATION LINE
- EXIST DRAINAGE STRUCTURE
- APPARENT R.O.W.
- PROPOSED CABLE BARRIER FENCE WITH 3' MOW STRIP
- TL-4 CABLE BARRIER TERMINAL
- TEMP SEDMT CONT FENCE
- TRAFFIC FLOW ARROWS

DESIGN

STATE OF TEXAS — JUSTIN W. CLARK — 118715 — LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 3/19/2024 DATE

APPROVAL

STATE OF TEXAS — GILMER D. GASTON — 80472 — LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 3/19/2024 DATE

0 50 100 150

SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

US 281: CABLE BARRIER

PROPOSED CABLE BARRIER LAYOUT

STA 1080+00 TO STA 1100+00

SHEET 5 OF 34

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	38

Plotted on: 3/19/2024
Design Filename: P:\122\96\02\Tasks\13_US 281 Cable Barrier\Design\Civil\Roadway\1229502_13_RDWY5.dgn

NOTES:
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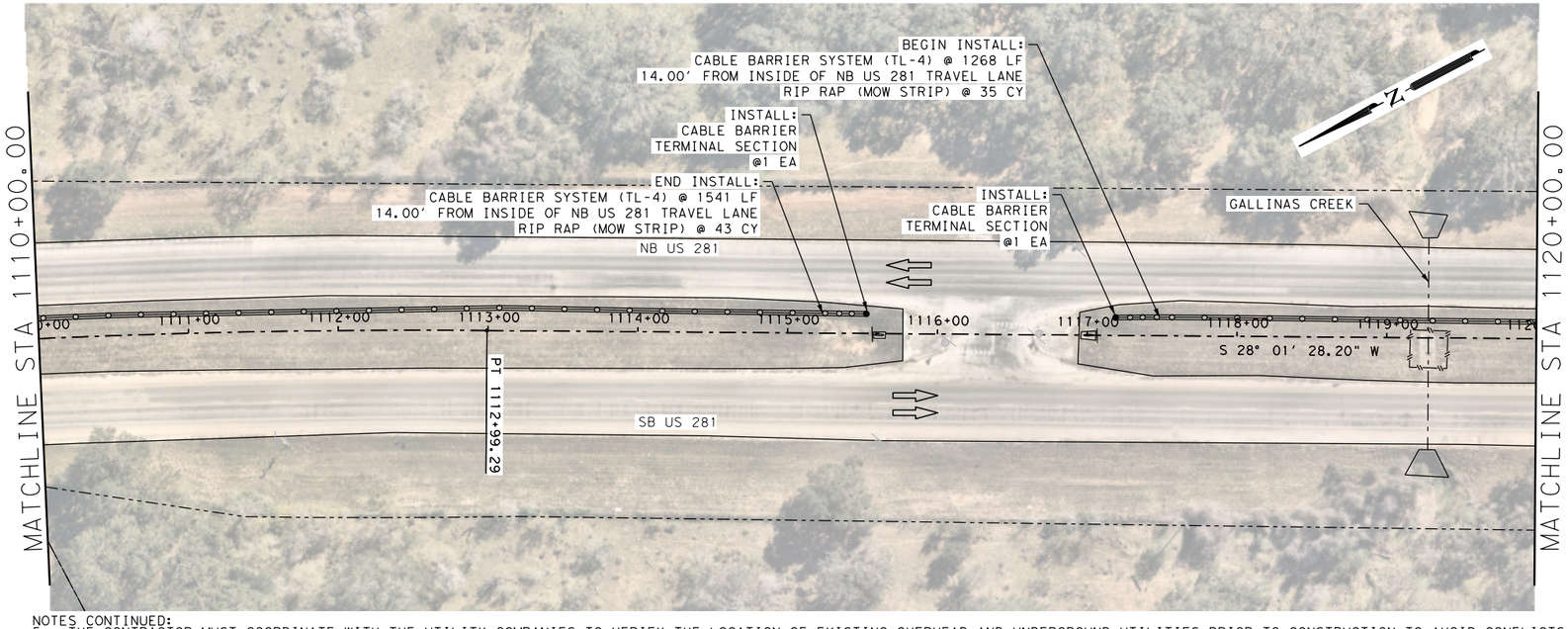
4. UTILITY LOCATIONS ARE APPROXIMATE. ALL UTILITIES ARE SHOWN BASED ON AVAILABLE AS-BUILT DRAWINGS AND 811 UTILITY LOCATE. CONTRACTOR MUST FIELD VERIFY THE EXACT LOCATION OF EXISTING ROW, POLES, ELECTRICAL SERVICES, GROUND BOXES, AND OTHER PERTINENT ITEMS BEFORE COMMENCING WORK.



NOTES CONTINUED:
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6. STATIONING IS NOT TRUE IDENTIFICATION OF THE ROADWAY ALIGNMENT. NO TOPOGRAPHIC FILE WAS USED AS A BASIS FOR STATIONING.
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11. FPA NOTIFICATION FOR ATASCOSA COUNTY WAS SUBMITTED IN WRITING ON MARCH, 19, 2024.

ITEM	DESCRIPTION	UNIT	QTY
0132-6021	EMBANKMENT (VEHICLE)(ORD COMP)(TY C)	CY	12
0150-6002	BLADING	HR	10.0
0164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	1185
0164-6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	1185
0168-6001	VEGETATIVE WATERING	MG	18.49
0169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	1185
0432-6066	RIPRAP (CL A) (MOW STRIP) (3 IN)	CY	49
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	100
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	100
0506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	20
0506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	20
0543-6002	CABLE BARRIER SYSTEM (TL-4)	LF	1778
0543-6020	CABLE BARRIER TERMINAL SECTION (TL-4)	EA	2

LEGEND

- OH E — EXIST OVERHEAD ELECTRIC LINE
- OH C — EXIST OVERHEAD COMMUNICATION LINE
- EXIST DRAINAGE STRUCTURE
- APPARENT R.O.W.
- PROPOSED CABLE BARRIER FENCE WITH 3' MOW STRIP
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DESIGN

STATE OF TEXAS — JUSTIN W. CLARK — 118715 — LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 3/19/2024 DATE

APPROVAL

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SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

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TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

US 281: CABLE BARRIER

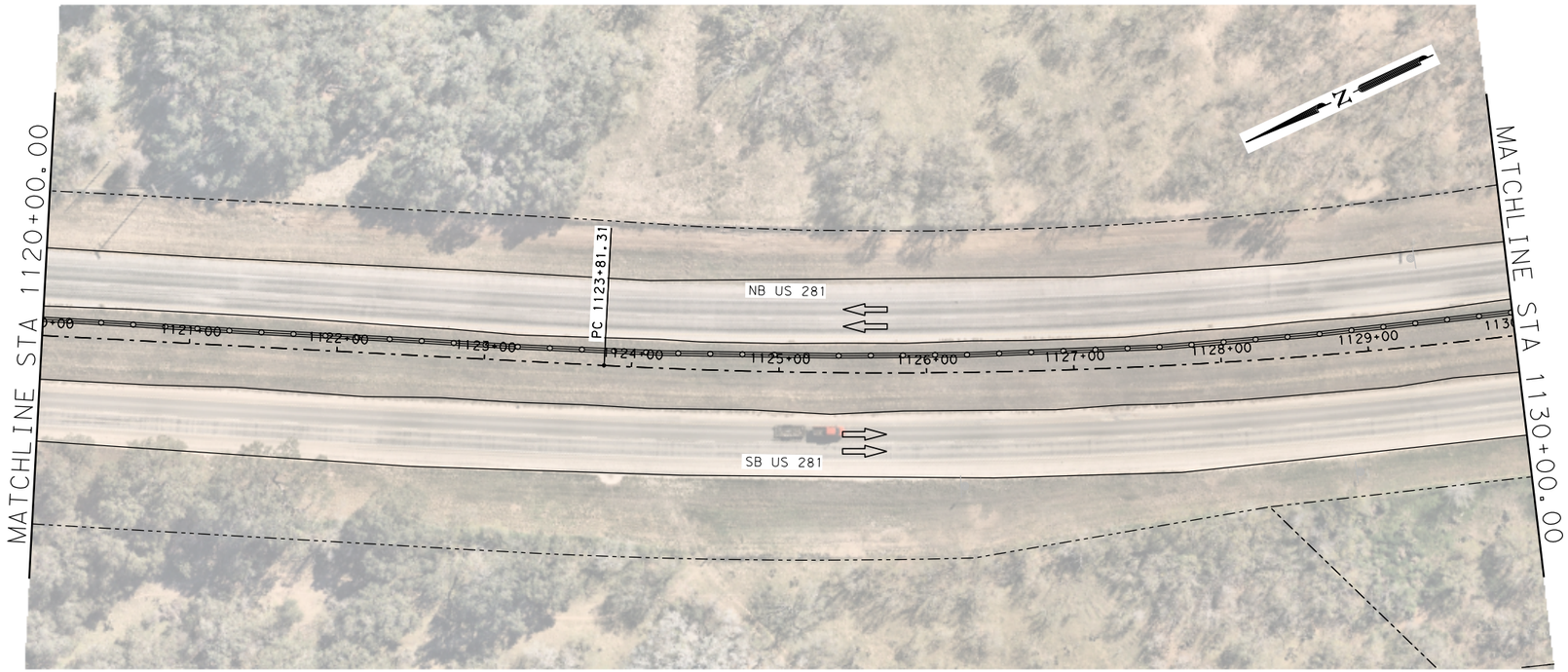
PROPOSED CABLE BARRIER LAYOUT

STA 1100+00 TO STA 1120+00

SHEET 6 OF 34

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	39

ITEM	DESCRIPTION	UNIT	QTY
0132-6021	EMBANKMENT (VEHICLE)(ORD COMP)(TY C)	CY	11
0150-6002	BLADING	HR	8.0
0164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	1017
0164-6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	1017
0168-6001	VEGETATIVE WATERING	MG	15.87
0169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	1017
0432-6066	RIPRAP (CL A) (MOW STRIP) (3 IN)	CY	42
0543-6002	CABLE BARRIER SYSTEM (TL-4)	LF	1525
0543-6020	CABLE BARRIER TERMINAL SECTION (TL-4)	EA	2



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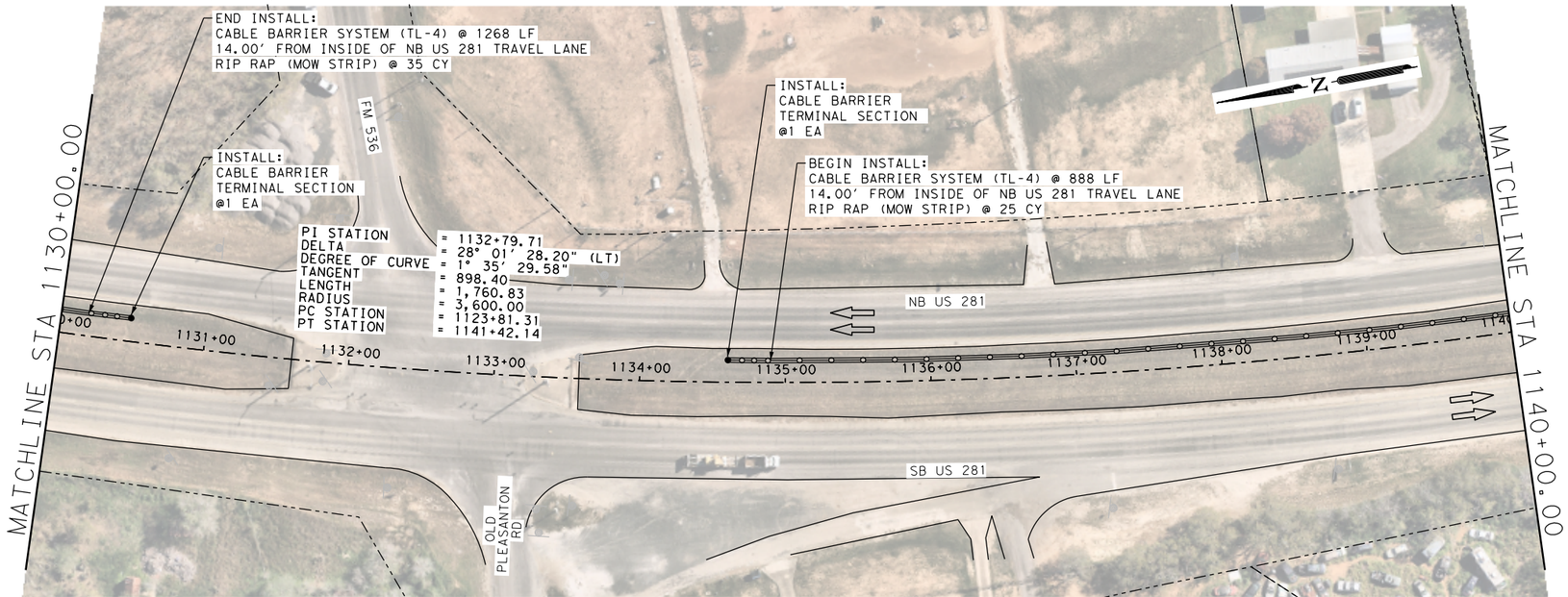

NOTES CONTINUED:
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LEGEND

- OH E — EXIST OVERHEAD ELECTRIC LINE
- OH C — EXIST OVERHEAD COMMUNICATION LINE
- EXIST DRAINAGE STRUCTURE
- APPAREN T R.O.W.
- PROPOSED CABLE BARRIER FENCE WITH 3' MOW STRIP
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- TEMP SEDMT CONT FENCE
- TRAFFIC FLOW ARROWS

DESIGN

STATE OF TEXAS — JUSTIN W. CLARK — 118715 — LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 3/19/2024 DATE

APPROVAL

STATE OF TEXAS — GILMER D. GASTON — 80472 — LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 3/19/2024 DATE

0 50 100 150

SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

US 281: CABLE BARRIER

PROPOSED CABLE BARRIER LAYOUT

STA 1120+00 TO STA 1140+00

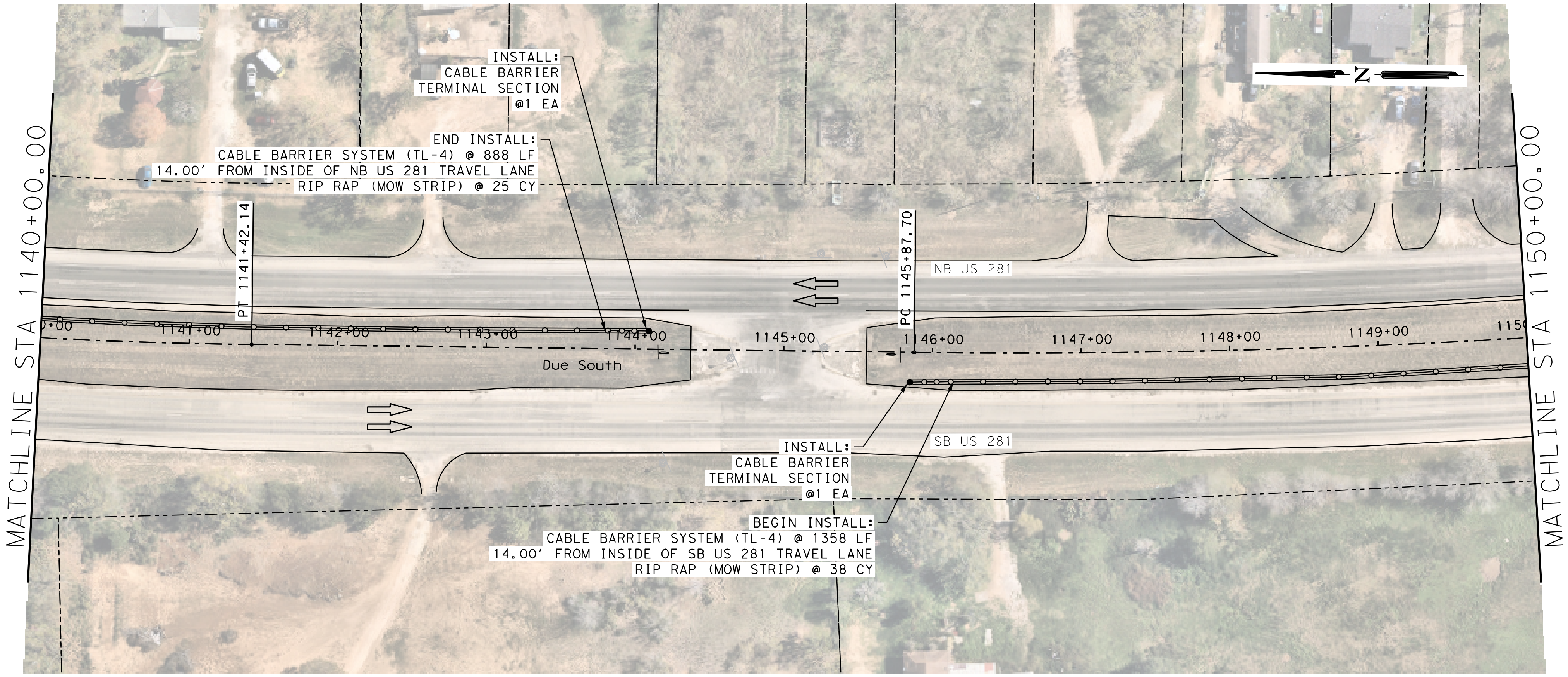
SHEET 7 OF 34

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	40

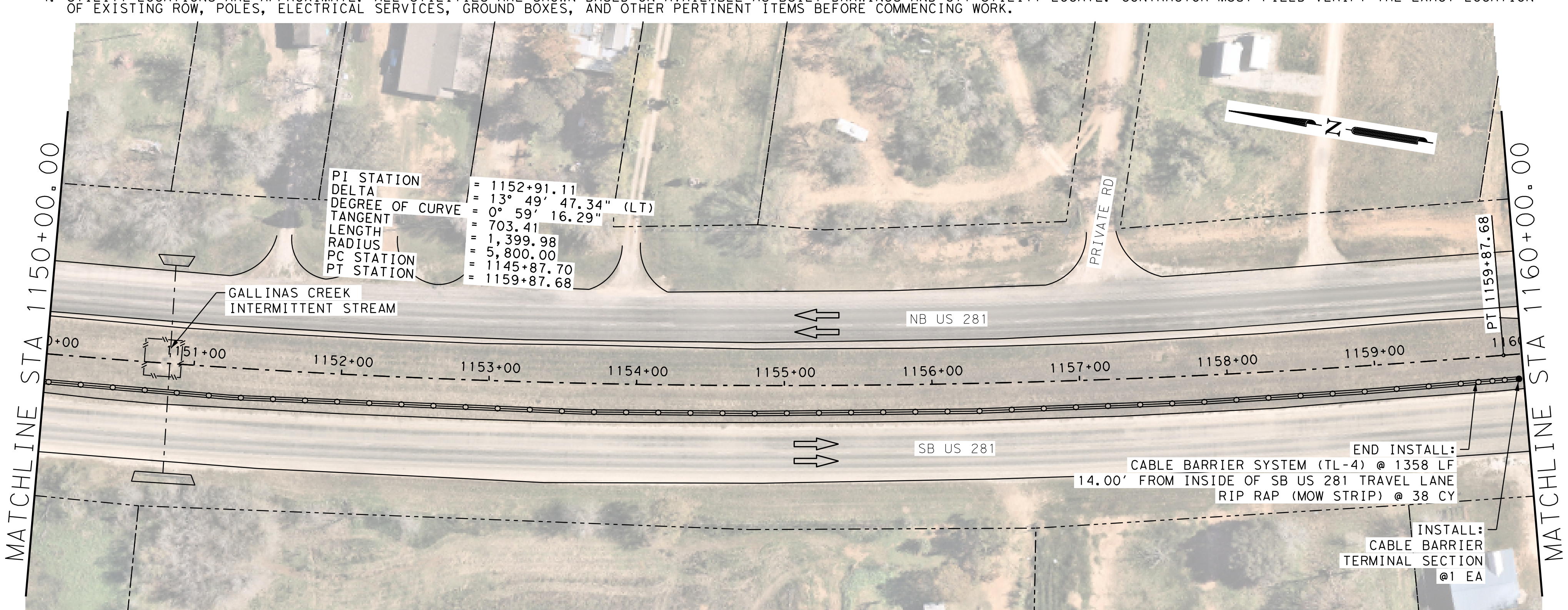
Plotted on: 3/19/2024

Design Filename: P:\122.96\02\Tasks\13_US 281 Cable Barrier\Design\Civil\Roadway\1229502_13_RDWY7.dgn

ITEM	DESCRIPTION	UNIT	QTY
0132-6021	EMBANKMENT (VEHICLE)(ORD COMP)(TY C)	CY	12
0150-6002	BLADING	HR	10.0
0164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	1158
0164-6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	1158
0168-6001	VEGETATIVE WATERING	MG	18.06
0169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	1158
0432-6066	RIPRAP (CL A) (MOW STRIP) (3 IN)	CY	48
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	100
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	100
0506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	20
0506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	20
0543-6002	CABLE BARRIER SYSTEM (TL-4)	LF	1737
0543-6020	CABLE BARRIER TERMINAL SECTION (TL-4)	EA	3



NOTES:
1. ALL RIGHT-OF-WAY LINES ARE APPROXIMATE. VERIFY LOCATIONS AS NECESSARY
2. CABLE BARRIERS ARE DESIGNED TO BE PLACED ON 6:1 (16.67%) OR FLATTER SIDE SLOPES. TOPOGRAPHICAL SURVEYING WAS NOT PERFORMED ON THIS PROJECT. BASELINE COINCIDENCES WITH THE FLOWLINE OF DITCH. CABLE BARRIER LOCATIONS MAY BE ADJUSTED AS NEEDED TO FIT FIELD CONDITIONS AS DIRECTED BY THE ENGINEER.
3. CABLE BARRIERS SHALL BE PLACED WITH AT LEAST 12 FEET OFFSET FROM EDGE OF THE TRAVEL LANE. CABLE BARRIERS SHALL BE PLACED AT LEAST 8 FEET FROM THE BOTTOM OF THE DITCHLINE. OFFSET OF AT LEAST 5 FEET FROM THE EDGE OF ILLUMINATION POLE IS RECCOMMENDED.
4. UTILITY LOCATIONS ARE APPROXIMATE. ALL UTILITIES ARE SHOWN BASED ON AVAILABLE AS-BUILT DRAWINGS AND 811 UTILITY LOCATE. CONTRACTOR MUST FIELD VERIFY THE EXACT LOCATION OF EXISTING ROW, POLES, ELECTRICAL SERVICES, GROUND BOXES, AND OTHER PERTINENT ITEMS BEFORE COMMENCING WORK.



NOTES CONTINUED:
5. THE CONTRACTOR MUST COORDINATE WITH THE UTILITY COMPANIES TO VERIFY THE LOCATION OF EXISTING OVERHEAD AND UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION TO AVOID CONFLICTS WITH, OR DAMAGE TO, THESE UTILITIES.
6. STATIONING IS NOT TRUE IDENTIFICATION OF THE ROADWAY ALIGNMENT. NO TOPOGRAPHIC FILE WAS USED AS A BASIS FOR STATIONING.
7. CONTRACTOR SHALL INSTALL TEMPORARY SEDIMENT CONTROL FENCES AS NEEDED (NOT SHOWN ON PLANS)
8. MOW STRIP SHALL BE 36 INCHES WIDE UNLESS OTHERWISE SPECIFIED BE THE ENGINEER.
9. DRILL SEEDING AND SOIL RETENTION BLANKETS SHALL BE APPLIED AT A MINIMUM OF 3 FEET ON EITHER SIDE OF CABLE BARRIER MOW STRIP FOR A TOTAL WIDTH OF 6 FEET.
10. NO WORK THAT COULD HAVE AN IMPACT TO THE EXISTING FEMA 100YR WSEL IS BEING PROPOSED FOR THIS PROJECT.
11. FPA NOTIFICATION FOR ATASCOSA COUNTY WAS SUBMITTED IN WRITING ON MARCH,19,2024.

LEGEND

OH E	EXIST OVERHEAD ELECTRIC LINE
OH C	EXIST OVERHEAD COMMUNICATION LINE
	EXIST DRAINAGE STRUCTURE
	APPARENT R.O.W.
	PROPOSED CABLE BARRIER FENCE WITH 3' MOW STRIP
	TL-4 CABLE BARRIER TERMINAL
	TEMP SEDMT CONT FENCE
	TRAFFIC FLOW ARROWS

DESIGN

STATE OF TEXAS
JUSTIN W. CLARK
118715
LICENSED
PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. 3/19/2024 DATE

APPROVAL

STATE OF TEXAS
GILMER D. GASTON
80472
LICENSED
PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. 3/19/2024 DATE

0 50 100 150
SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

Texas Department of Transportation

US 281: CABLE BARRIER

PROPOSED CABLE BARRIER LAYOUT

STA 1140+00 TO STA 1160+00

SHEET 8 OF 34

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	41

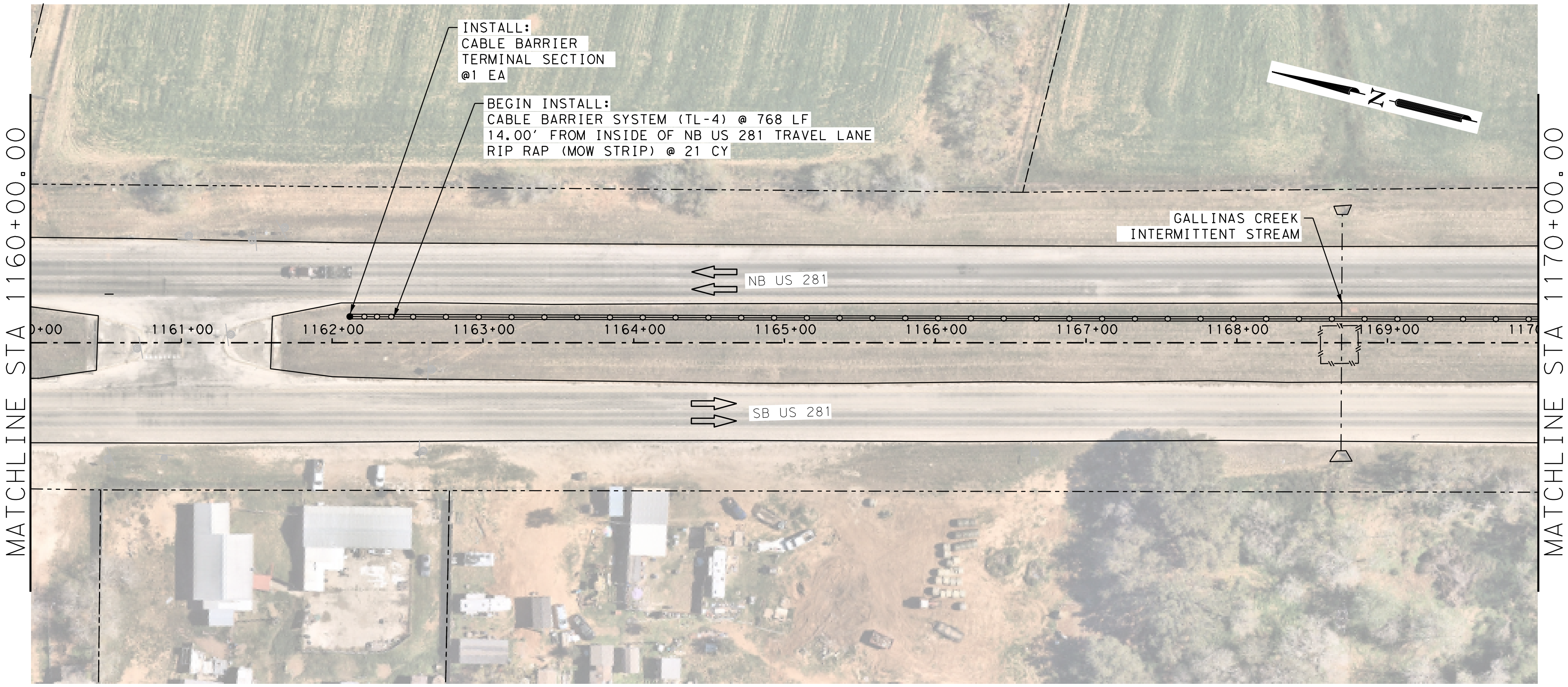
Plotted on: 3/19/2024

Design Filename: P:\122\96\02\Tasks\13_US 281 Cable Barrier\Design\Civil\Roadway\1229502_13_RDWY8.dgn

Plotted on: 3/19/2024

Design Filename: P:\122\96\02\Tasks\13_US 281 Cable Barrier\Design\Civil\Roadway\1229502_13_RDWY9.dgn

ITEM	DESCRIPTION	UNIT	QTY
0132-6021	EMBANKMENT (VEHICLE)(ORD COMP)(TY C)	CY	10
0150-6002	BLADING	HR	9.0
0164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	972
0164-6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	972
0168-6001	VEGETATIVE WATERING	MG	15.16
0169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	972
0432-6066	RIPRAP (CL A) (MOW STRIP) (3 IN)	CY	41
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	100
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	100
0506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	20
0506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	20
0543-6002	CABLE BARRIER SYSTEM (TL-4)	LF	1458
0543-6020	CABLE BARRIER TERMINAL SECTION (TL-4)	EA	3



NOTES:
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2. CABLE BARRIERS ARE DESIGNED TO BE PLACED ON 6:1 (16.67%) OR FLATTER SIDE SLOPES. TOPOGRAPHICAL SURVEYING WAS NOT PERFORMED ON THIS PROJECT. BASELINE COINCIDENCES WITH THE FLOWLINE OF DITCH. CABLE BARRIER LOCATIONS MAY BE ADJUSTED AS NEEDED TO FIT FIELD CONDITIONS AS DIRECTED BY THE ENGINEER.
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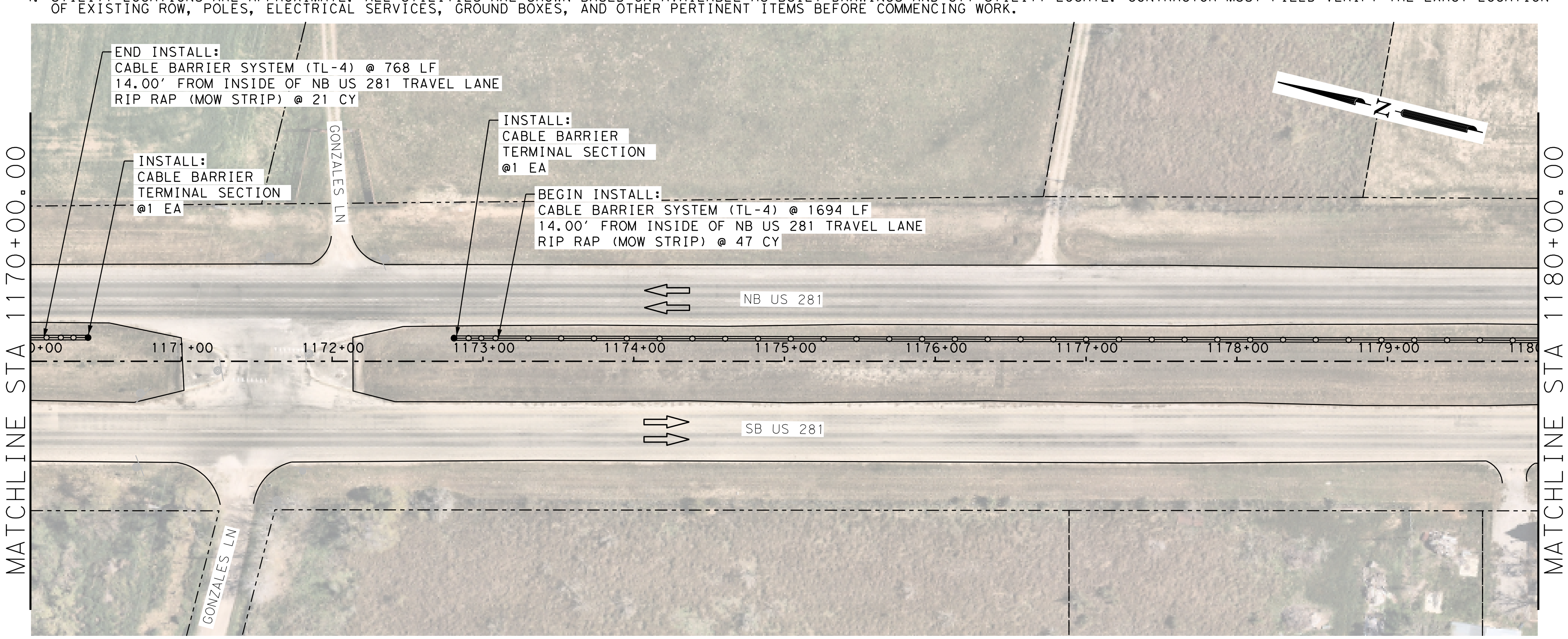

NOTES CONTINUED:
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11. FPA NOTIFICATION FOR ATASCOSA COUNTY WAS SUBMITTED IN WRITING ON MARCH,19,2024.

LEGEND

OH E	EXIST OVERHEAD ELECTRIC LINE
OH C	EXIST OVERHEAD COMMUNICATION LINE
	EXIST DRAINAGE STRUCTURE
	APPARENT R.O.W.
	PROPOSED CABLE BARRIER FENCE WITH 3' MOW STRIP
	TL-4 CABLE BARRIER TERMINAL
	TEMP SEDMT CONT FENCE
	TRAFFIC FLOW ARROWS

DESIGN

STATE OF TEXAS
JUSTIN W. CLARK
118715
LICENSED
PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. 3/19/2024 DATE

APPROVAL

STATE OF TEXAS
GILMER D. GASTON
80472
LICENSED
PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. 3/19/2024 DATE

0 50 100 150

SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028800

US 281: CABLE BARRIER

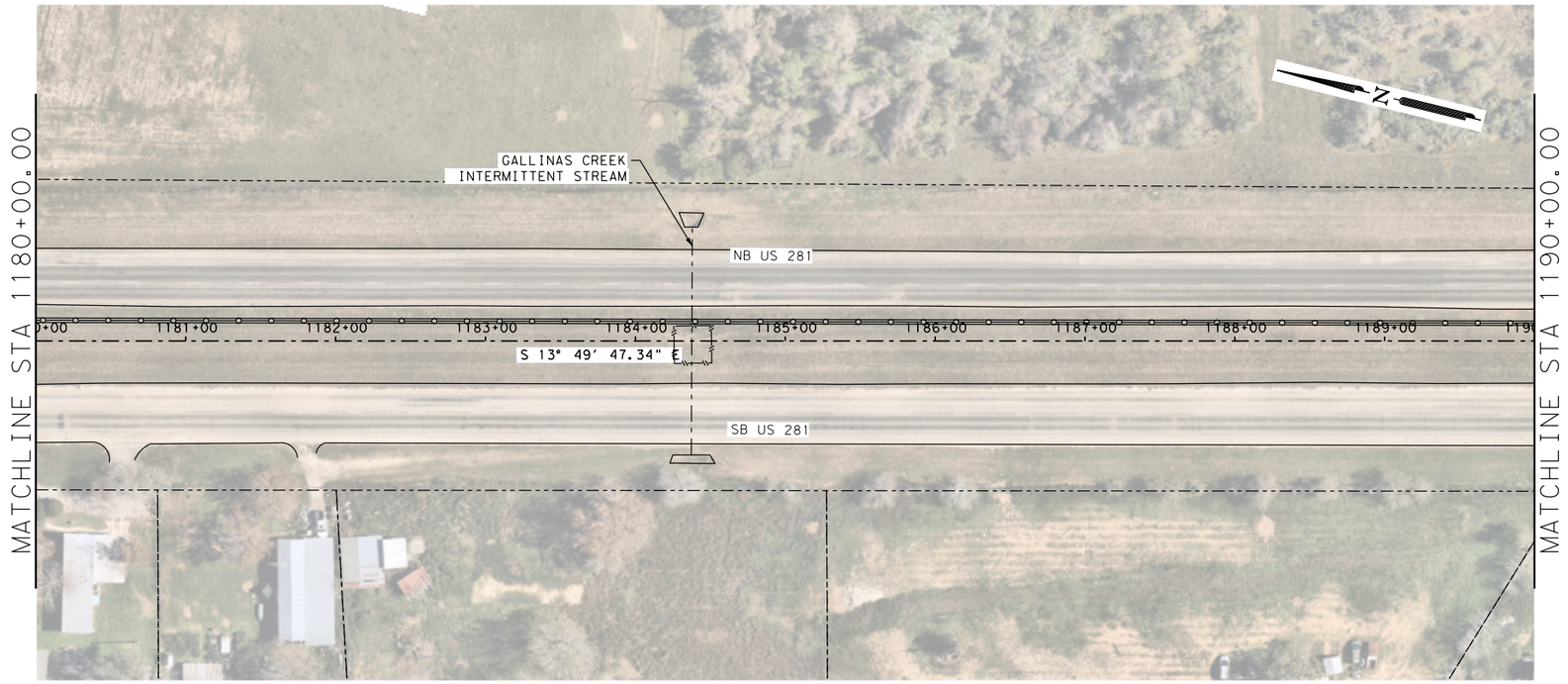
PROPOSED CABLE BARRIER LAYOUT

STA 1160+00 TO STA 1180+00

SHEET 9 OF 34

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	42

ITEM	DESCRIPTION	UNIT	QTY
0132-6021	EMBANKMENT (VEHICLE)(ORD COMP)(TY C)	CY	12
0150-6002	BLADING	HR	10.0
0164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	1166
0164-6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	1166
0168-6001	VEGETATIVE WATERING	MG	18.19
0169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	1166
0432-6066	RIPRAP (CL A) (MOW STRIP) (3 IN)	CY	49
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	100
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	100
0506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	20
0506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	20
0543-6002	CABLE BARRIER SYSTEM (TL-4)	LF	1749
0543-6020	CABLE BARRIER TERMINAL SECTION (TL-4)	EA	2



NOTES:
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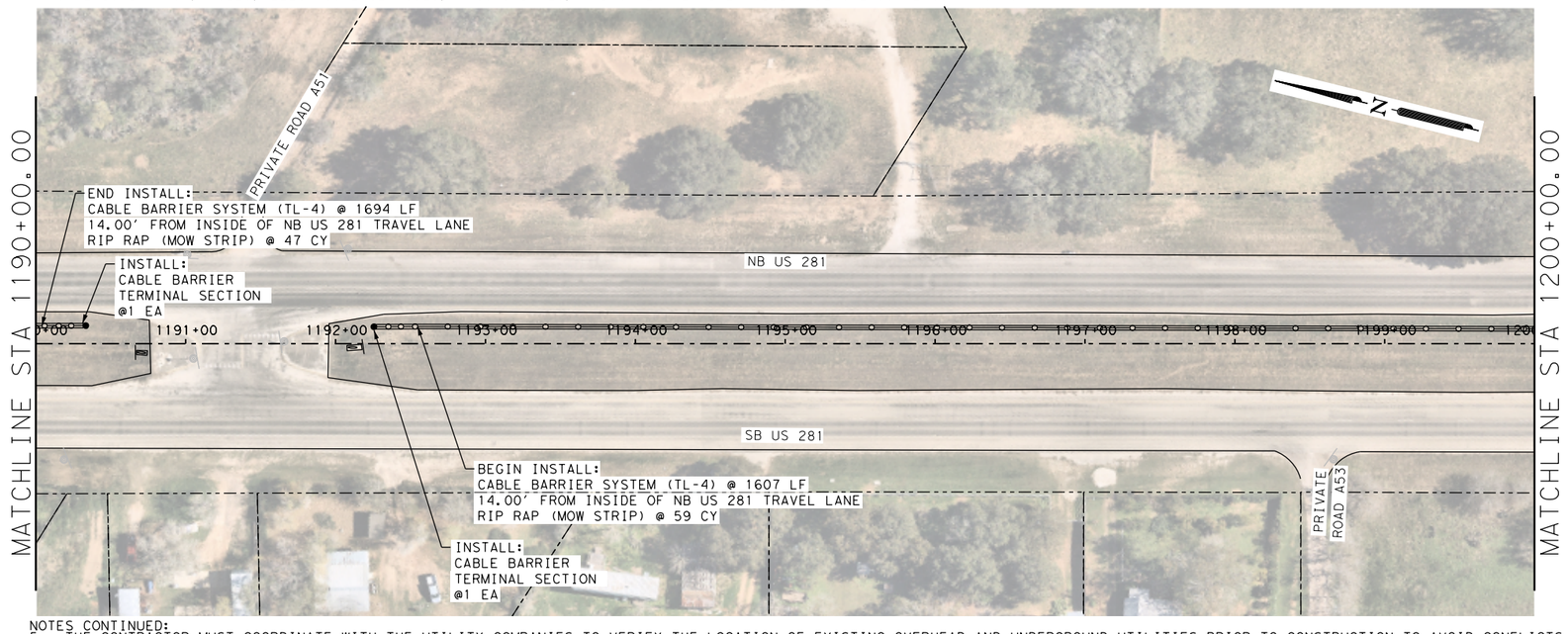

NOTES CONTINUED:
5. THE CONTRACTOR MUST COORDINATE WITH THE UTILITY COMPANIES TO VERIFY THE LOCATION OF EXISTING OVERHEAD AND UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION TO AVOID CONFLICTS WITH, OR DAMAGE TO, THESE UTILITIES.
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10. NO WORK THAT COULD HAVE AN IMPACT TO THE EXISTING FEMA 100YR WSEL IS BEING PROPOSED FOR THIS PROJECT.
11. FPA NOTIFICATION FOR ATASCOSA COUNTY WAS SUBMITTED IN WRITING ON MARCH, 19, 2024.

LEGEND

- OH E — EXIST OVERHEAD ELECTRIC LINE
- OH C — EXIST OVERHEAD COMMUNICATION LINE
- EXIST DRAINAGE STRUCTURE
- APPARENT R.O.W.
- PROPOSED CABLE BARRIER FENCE WITH 3' MOW STRIP
- TL-4 CABLE BARRIER TERMINAL
- TEMP SEDMT CONT FENCE
- TRAFFIC FLOW ARROWS

DESIGN

STATE OF TEXAS — JUSTIN W. CLARK — 118715 — LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 3/19/2024 DATE

APPROVAL

STATE OF TEXAS — GILMER D. GASTON — 80472 — LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 3/19/2024 DATE

0 50 100 150

SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

US 281: CABLE BARRIER

PROPOSED CABLE BARRIER LAYOUT

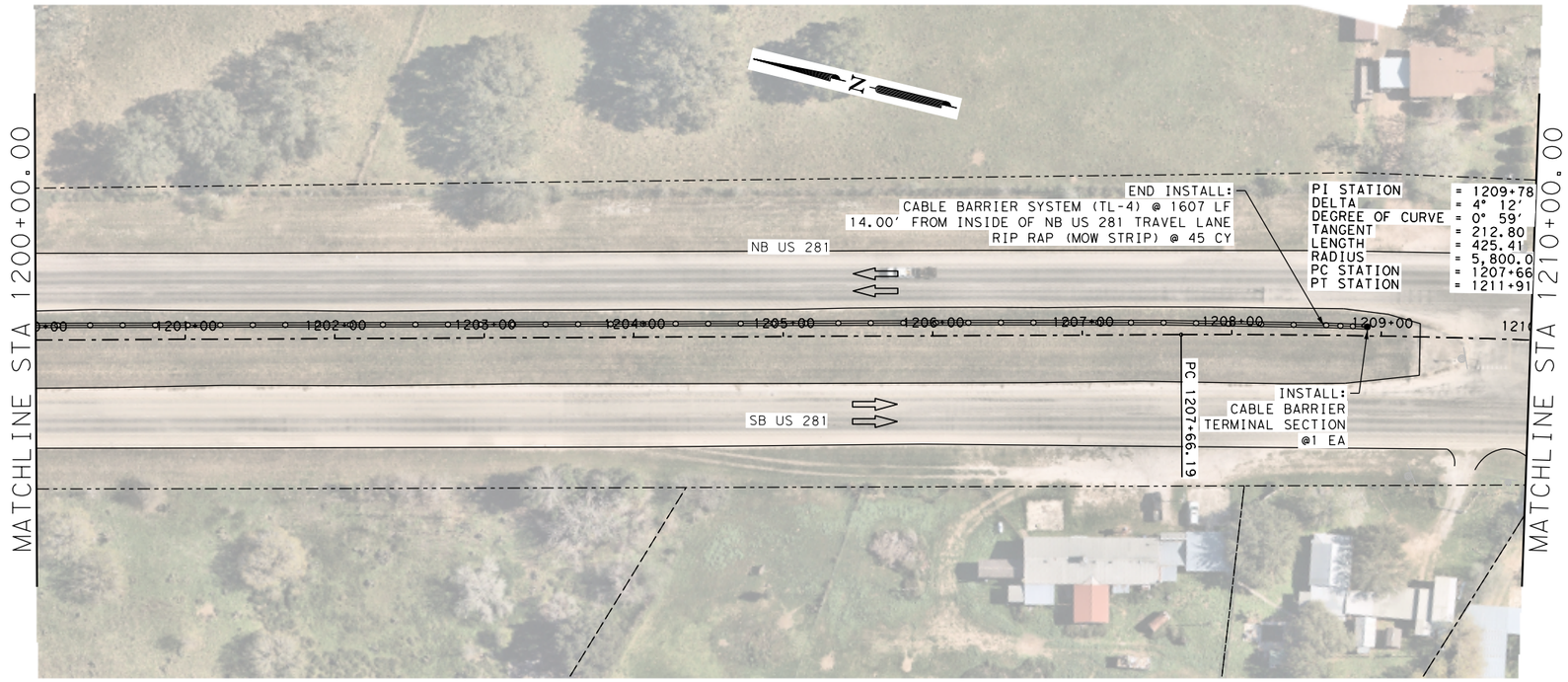
STA 1180+00 TO STA 1200+00

SHEET 10 OF 34

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	43

Plotted on: 3/19/2024

Design Filename: P:\122\96\02\Tasks\13_US 281 Cable Barrier\Design\Civil\Roadway\1229502_13_RDWY10.dgn



NOTES:
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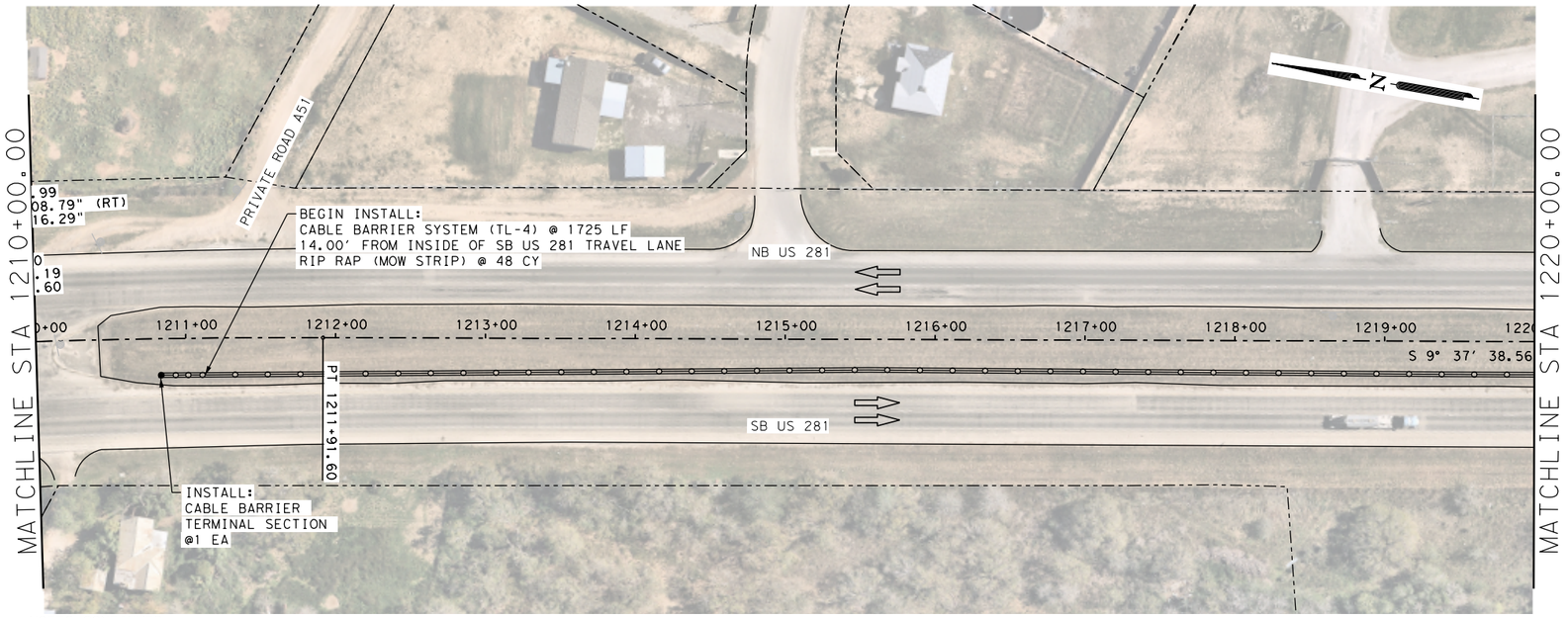

NOTES CONTINUED:
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ITEM	DESCRIPTION	UNIT	QTY
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0543-6020	CABLE BARRIER TERMINAL SECTION (TL-4)	EA	2

LEGEND

- OH E — EXIST OVERHEAD ELECTRIC LINE
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DESIGN

STATE OF TEXAS — JUSTIN W. CLARK — 118715 — LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 3/19/2024 DATE

APPROVAL

STATE OF TEXAS — GILMER D. GASTON — 80472 — LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 3/19/2024 DATE

0 50 100 150

SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

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TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

US 281: CABLE BARRIER

PROPOSED CABLE BARRIER LAYOUT

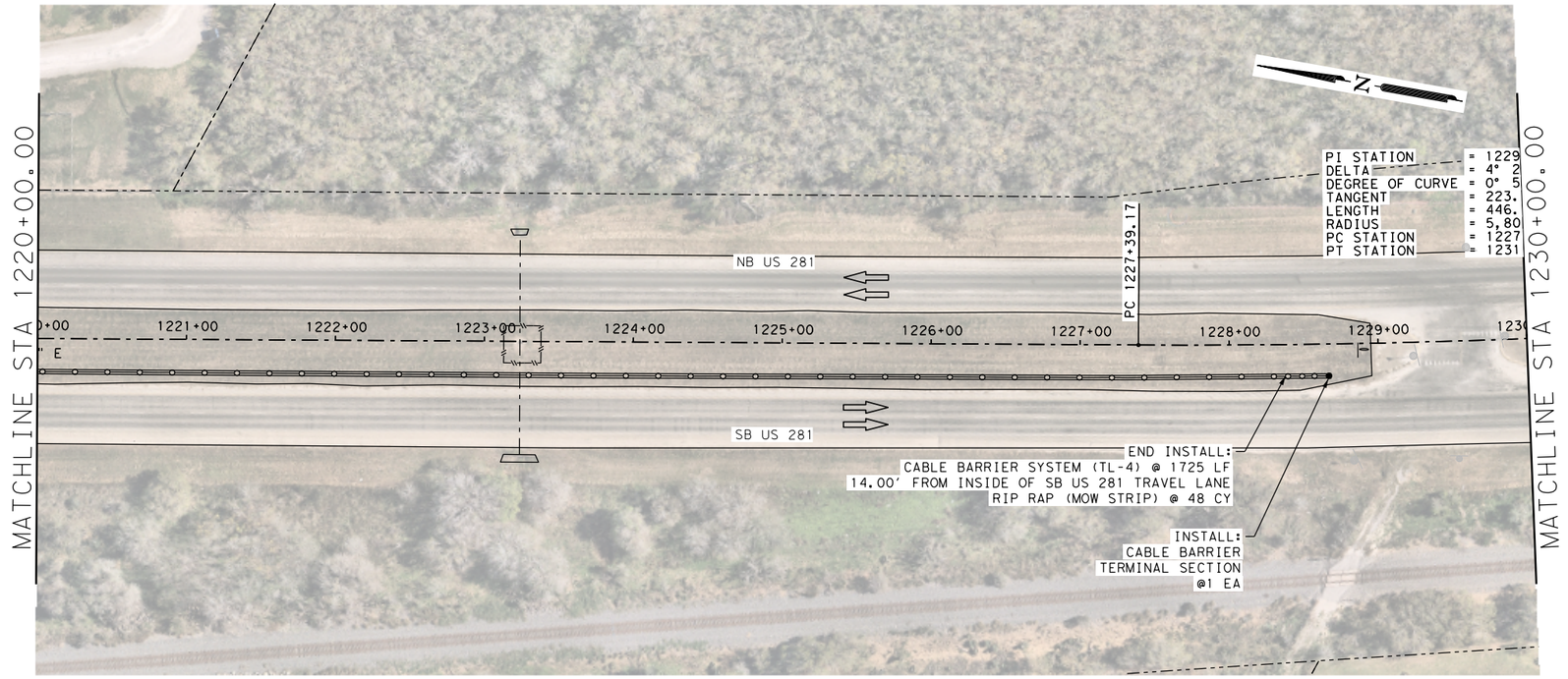
STA 1200+00 TO STA 1220+00

SHEET 11 OF 34

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	44

Plotted on: 3/19/2024

Design Filename: P:\122\96\02\Tasks\13_US 281 Cable Barrier\Design\Civil\Roadway\1229502_13_RDWY11.dgn



NOTES:
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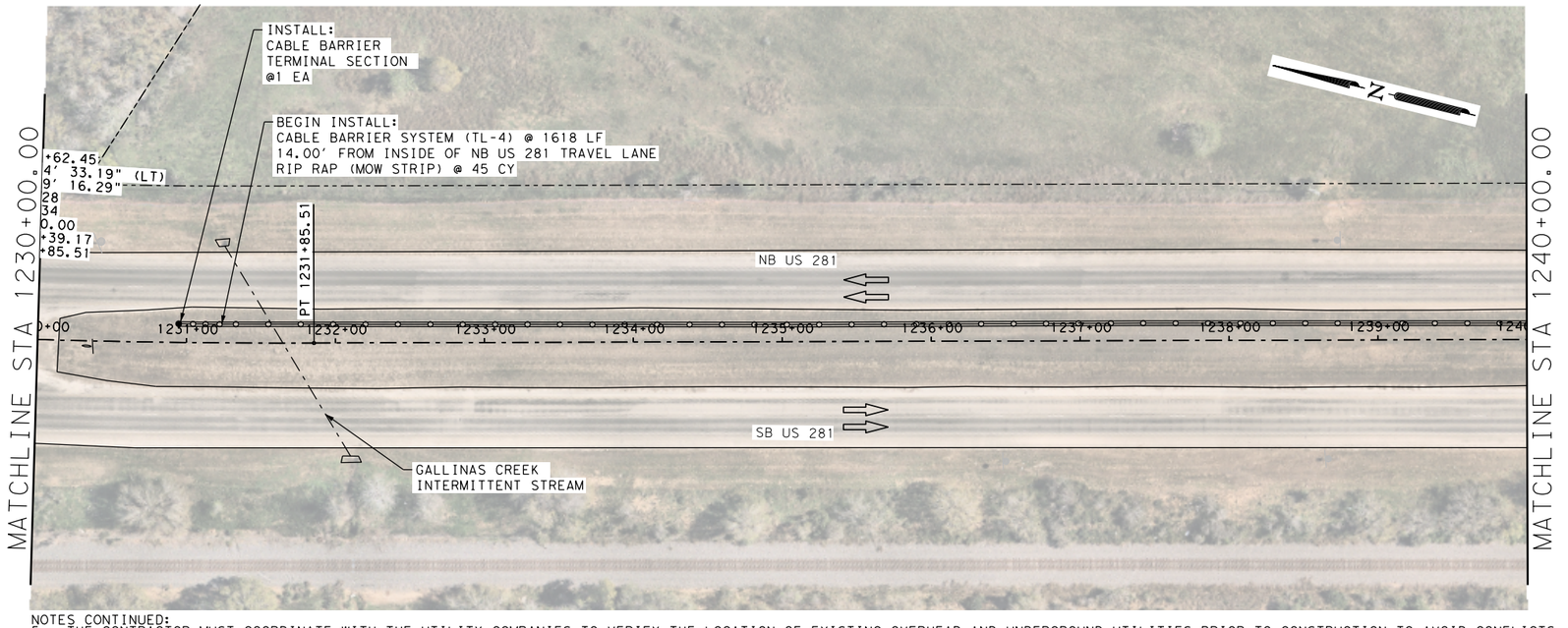

NOTES CONTINUED:
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7. CONTRACTOR SHALL INSTALL TEMPORARY SEDIMENT CONTROL FENCES AS NEEDED (NOT SHOWN ON PLANS)
8. MOW STRIP SHALL BE 36 INCHES WIDE UNLESS OTHERWISE SPECIFIED BE THE ENGINEER.
9. DRILL SEEDING AND SOIL RETENTION BLANKETS SHALL BE APPLIED AT A MINIMUM OF 3 FEET ON EITHER SIDE OF CABLE BARRIER MOW STRIP FOR A TOTAL WIDTH OF 6 FEET.
10. NO WORK THAT COULD HAVE AN IMPACT TO THE EXISTING FEMA 100YR WSEL IS BEING PROPOSED FOR THIS PROJECT.
11. FPA NOTIFICATION FOR ATASCOSA COUNTY WAS SUBMITTED IN WRITING ON MARCH, 19, 2024.

ITEM	DESCRIPTION	UNIT	QTY
0132-6021	EMBANKMENT (VEHICLE)(ORD COMP)(TY C)	CY	12
0150-6002	BLADING	HR	9.0
0164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	1143
0164-6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	1143
0168-6001	VEGETATIVE WATERING	MG	17.83
0169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	1143
0432-6066	RIPRAP (CL A) (MOW STRIP) (3 IN)	CY	48
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	100
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	100
0506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	20
0506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	20
0543-6002	CABLE BARRIER SYSTEM (TL-4)	LF	1714
0543-6020	CABLE BARRIER TERMINAL SECTION (TL-4)	EA	2

LEGEND

- OH E — EXIST OVERHEAD ELECTRIC LINE
- OH C — EXIST OVERHEAD COMMUNICATION LINE
- EXIST DRAINAGE STRUCTURE
- APPARENT R.O.W.
- PROPOSED CABLE BARRIER FENCE WITH 3' MOW STRIP
- TL-4 CABLE BARRIER TERMINAL
- TEMP SEDMT CONT FENCE
- TRAFFIC FLOW ARROWS

DESIGN

STATE OF TEXAS — JUSTIN W. CLARK — 118715 — LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 3/19/2024 DATE

APPROVAL

STATE OF TEXAS — GILMER D. GASTON — 80472 — LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 3/19/2024 DATE

0 50 100 150

SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

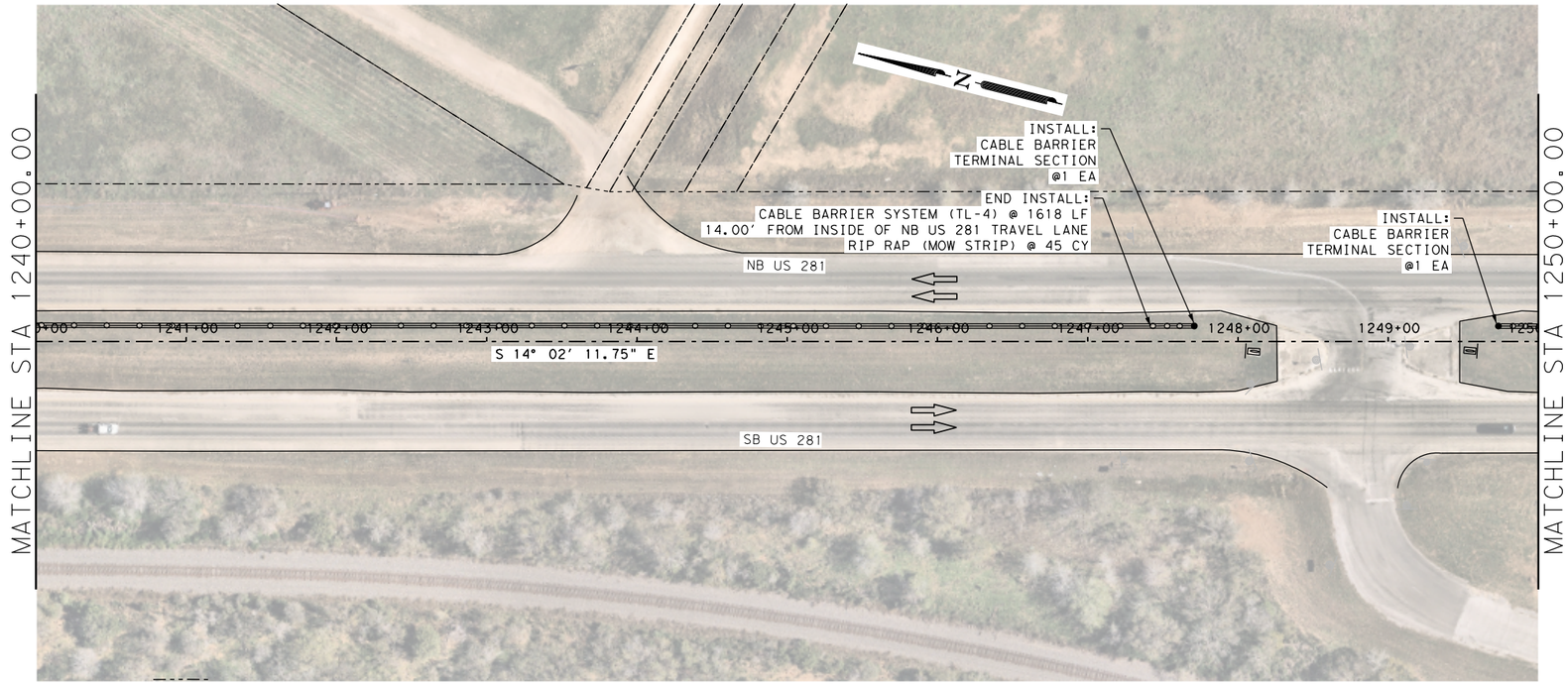
US 281: CABLE BARRIER

PROPOSED CABLE BARRIER LAYOUT

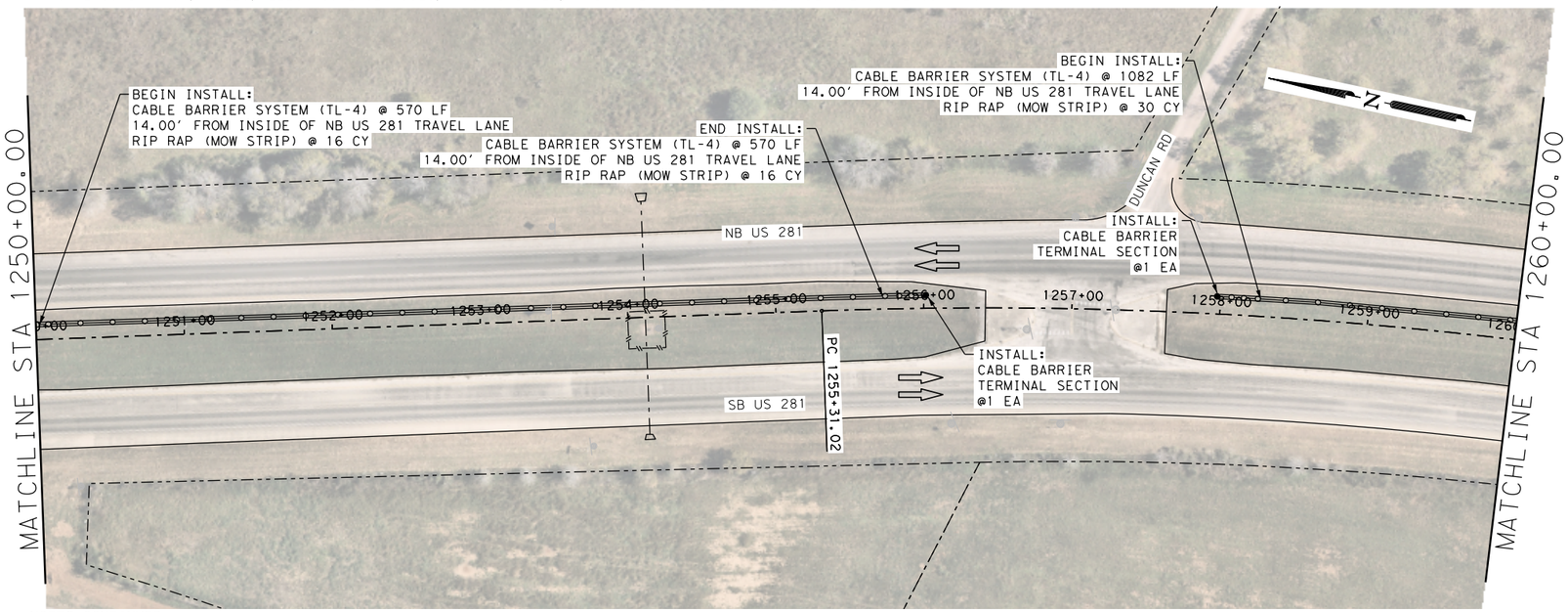
STA 1220+00 TO STA 1240+00

SHEET 12 OF 34

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	45



NOTES:
1. ALL RIGHT-OF-WAY LINES ARE APPROXIMATE. VERIFY LOCATIONS AS NECESSARY
2. CABLE BARRIERS ARE DESIGNED TO BE PLACED ON 6:1 (16.67%) OR FLATTER SIDE SLOPES. TOPOGRAPHICAL SURVEYING WAS NOT PERFORMED ON THIS PROJECT. BASELINE COINCIDENCES WITH THE FLOWLINE OF DITCH. CABLE BARRIER LOCATIONS MAY BE ADJUSTED AS NEEDED TO FIT FIELD CONDITIONS AS DIRECTED BY THE ENGINEER.
3. CABLE BARRIERS SHALL BE PLACED WITH AT LEAST 12 FEET OFFSET FROM EDGE OF THE TRAVEL LANE. CABLE BARRIERS SHALL BE PLACED AT LEAST 8 FEET FROM THE BOTTOM OF THE DITCHLINE. OFFSET OF AT LEAST 5 FEET FROM THE EDGE OF ILLUMINATION POLE IS RECCOMMENDED.
4. UTILITY LOCATIONS ARE APPROXIMATE. ALL UTILITIES ARE SHOWN BASED ON AVAILABLE AS-BUILT DRAWINGS AND 811 UTILITY LOCATE. CONTRACTOR MUST FIELD VERIFY THE EXACT LOCATION OF EXISTING ROW, POLES, ELECTRICAL SERVICES, GROUND BOXES, AND OTHER PERTINENT ITEMS BEFORE COMMENCING WORK.



NOTES CONTINUED:
5. THE CONTRACTOR MUST COORDINATE WITH THE UTILITY COMPANIES TO VERIFY THE LOCATION OF EXISTING OVERHEAD AND UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION TO AVOID CONFLICTS WITH, OR DAMAGE TO, THESE UTILITIES.
6. STATIONING IS NOT TRUE IDENTIFICATION OF THE ROADWAY ALIGNMENT. NO TOPOGRAPHIC FILE WAS USED AS A BASIS FOR STATIONING.
7. CONTRACTOR SHALL INSTALL TEMPORARY SEDIMENT CONTROL FENCES AS NEEDED (NOT SHOWN ON PLANS)
8. MOW STRIP SHALL BE 36 INCHES WIDE UNLESS OTHERWISE SPECIFIED BE THE ENGINEER.
9. DRILL SEEDING AND SOIL RETENTION BLANKETS SHALL BE APPLIED AT A MINIMUM OF 3 FEET ON EITHER SIDE OF CABLE BARRIER MOW STRIP FOR A TOTAL WIDTH OF 6 FEET.
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11. FPA NOTIFICATION FOR ATASCOSA COUNTY WAS SUBMITTED IN WRITING ON MARCH,19,2024.

ITEM	DESCRIPTION	UNIT	QTY
0132-6021	EMBANKMENT (VEHICLE)(ORD COMP)(TY C)	CY	10
0150-6002	BLADING	HR	10.0
0164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	990
0164-6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	990
0168-6001	VEGETATIVE WATERING	MG	15.44
0169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	990
0432-6066	RIPRAP (CL A) (MOW STRIP) (3 IN)	CY	41
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	100
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	100
0506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	20
0506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	20
0543-6002	CABLE BARRIER SYSTEM (TL-4)	LF	1485
0543-6020	CABLE BARRIER TERMINAL SECTION (TL-4)	EA	4

LEGEND

- OH E — EXIST OVERHEAD ELECTRIC LINE
- OH C — EXIST OVERHEAD COMMUNICATION LINE
- EXIST DRAINAGE STRUCTURE
- APPARENT R.O.W.
- PROPOSED CABLE BARRIER FENCE WITH 3' MOW STRIP
- TL-4 CABLE BARRIER TERMINAL
- TEMP SEDMT CONT FENCE
- TRAFFIC FLOW ARROWS

DESIGN

STATE OF TEXAS — JUSTIN W. CLARK — 118715 — LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 3/19/2024 DATE

APPROVAL

STATE OF TEXAS — GILMER D. GASTON — 80472 — LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 3/19/2024 DATE

0 50 100 150
SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

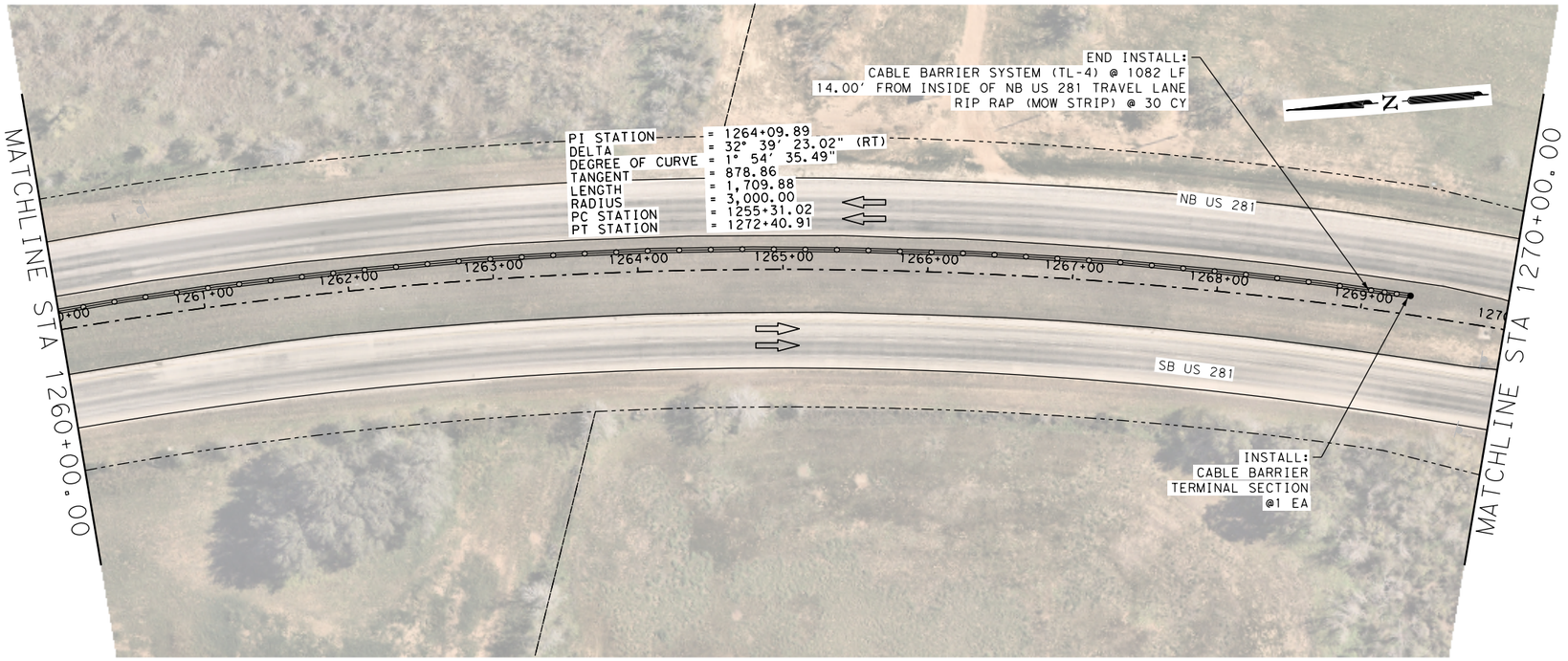
US 281: CABLE BARRIER

PROPOSED CABLE BARRIER LAYOUT

STA 1240+00 TO STA 1260+00

SHEET 13 OF 34

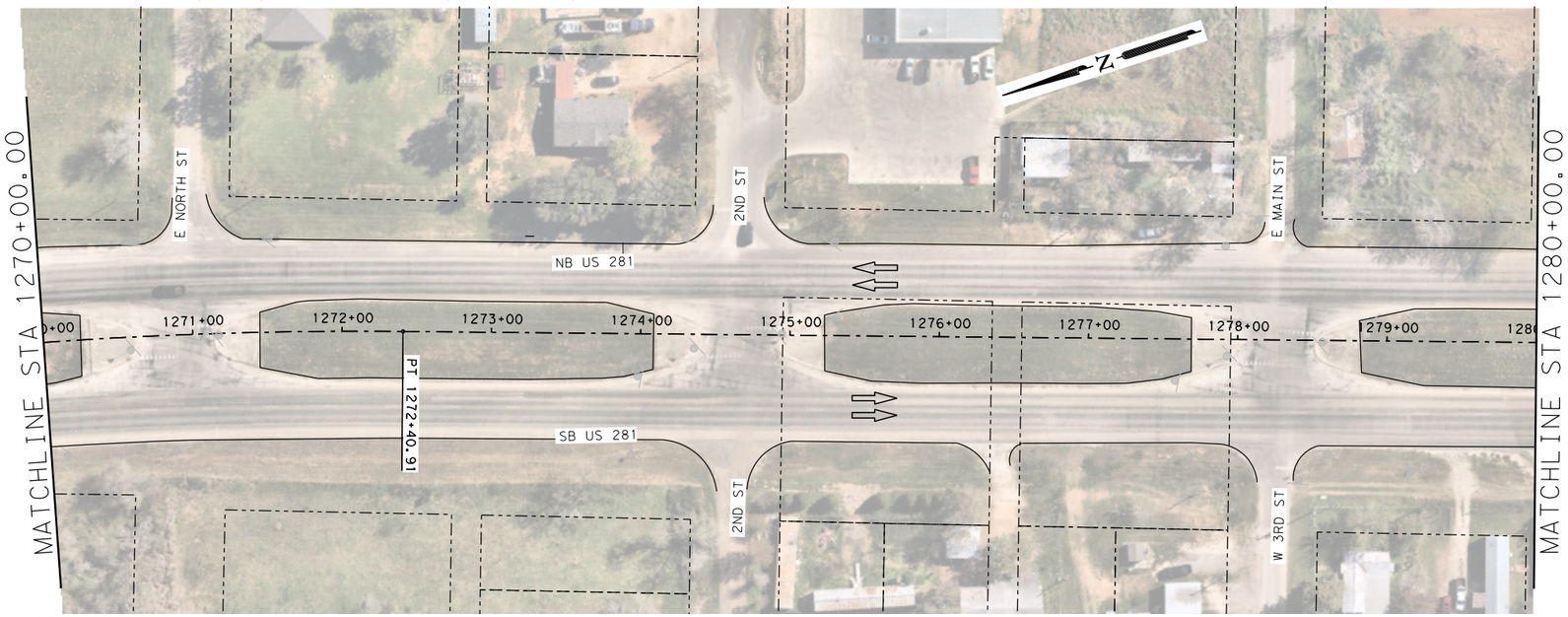
DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	46



ITEM	DESCRIPTION	UNIT	QTY
0132-6021	EMBANKMENT (VEHICLE)(ORD COMP)(TY C)	CY	6
0150-6002	BLADING	HR	5.0
0164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	605
0164-6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	605
0168-6001	VEGETATIVE WATERING	MG	9.44
0169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	605
0432-6066	RIPRAP (CL A) (MOW STRIP) (3 IN)	CY	25
0543-6002	CABLE BARRIER SYSTEM (TL-4)	LF	908
0543-6020	CABLE BARRIER TERMINAL SECTION (TL-4)	EA	1

LEGEND

- OH E — EXIST OVERHEAD ELECTRIC LINE
- OH C — EXIST OVERHEAD COMMUNICATION LINE
- EXIST DRAINAGE STRUCTURE
- APPARENT R.O.W.
- PROPOSED CABLE BARRIER FENCE WITH 3' MOW STRIP
- TL-4 CABLE BARRIER TERMINAL
- TEMP SEDMT CONT FENCE
- TRAFFIC FLOW ARROWS



NOTES:
1. ALL RIGHT-OF-WAY LINES ARE APPROXIMATE. VERIFY LOCATIONS AS NECESSARY
2. CABLE BARRIERS ARE DESIGNED TO BE PLACED ON 6:1 (16.67%) OR FLATTER SIDE SLOPES. TOPOGRAPHICAL SURVEYING WAS NOT PERFORMED ON THIS PROJECT. BASELINE COINCIDENCES WITH THE FLOWLINE OF DITCH. CABLE BARRIER LOCATIONS MAY BE ADJUSTED AS NEEDED TO FIT FIELD CONDITIONS AS DIRECTED BY THE ENGINEER.
3. CABLE BARRIERS SHALL BE PLACED WITH AT LEAST 12 FEET OFFSET FROM EDGE OF THE TRAVEL LANE. CABLE BARRIERS SHALL BE PLACED AT LEAST 8 FEET FROM THE BOTTOM OF THE DITCHLINE. OFFSET OF AT LEAST 5 FEET FROM THE EDGE OF ILLUMINATION POLE IS RECCOMMENDED.
4. UTILITY LOCATIONS ARE APPROXIMATE. ALL UTILITIES ARE SHOWN BASED ON AVAILABLE AS-BUILT DRAWINGS AND 811 UTILITY LOCATE. CONTRACTOR MUST FIELD VERIFY THE EXACT LOCATION OF EXISTING ROW, POLES, ELECTRICAL SERVICES, GROUND BOXES, AND OTHER PERTINENT ITEMS BEFORE COMMENCING WORK.

NOTES CONTINUED:
5. THE CONTRACTOR MUST COORDINATE WITH THE UTILITY COMPANIES TO VERIFY THE LOCATION OF EXISTING OVERHEAD AND UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION TO AVOID CONFLICTS WITH, OR DAMAGE TO, THESE UTILITIES.
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10. NO WORK THAT COULD HAVE AN IMPACT TO THE EXISTING FEMA 100YR WSEL IS BEING PROPOSED FOR THIS PROJECT.
11. FPA NOTIFICATION FOR ATASCOSA COUNTY WAS SUBMITTED IN WRITING ON MARCH, 19, 2024.

DESIGN

JUSTIN W. CLARK, 118715, LICENSED PROFESSIONAL ENGINEER, STATE OF TEXAS

JUSTIN W. CLARK, P.E. — 3/19/2024 DATE

APPROVAL

GILMER D. GASTON, 80472, LICENSED PROFESSIONAL ENGINEER, STATE OF TEXAS

GILMER D. GASTON, P.E. — 3/19/2024 DATE

0 50 100 150

SCALE: 1" = 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

Texas Department of Transportation ©2024

US 281: CABLE BARRIER

PROPOSED CABLE BARRIER LAYOUT

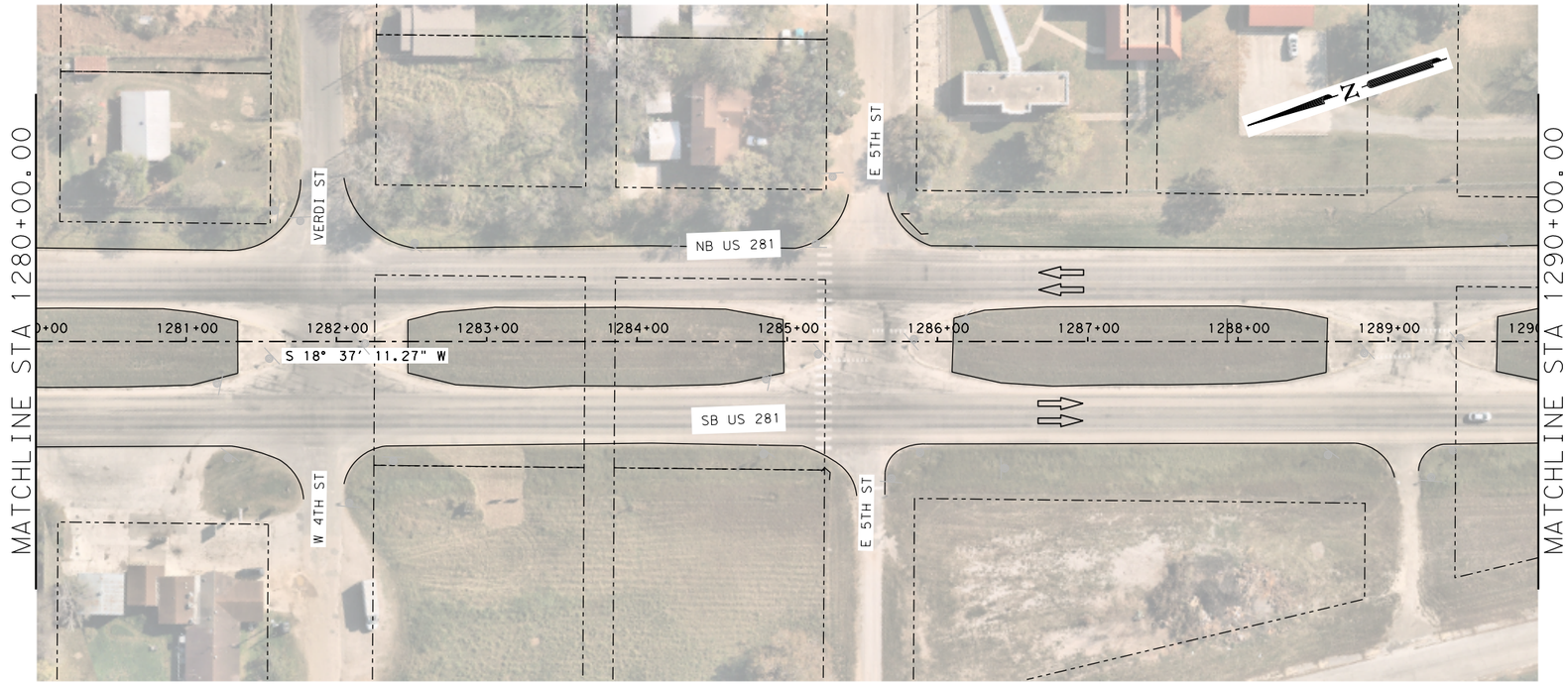
STA 1260+00 TO STA 1280+00

SHEET 14 OF 34

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	47

Plotted on: 3/19/2024

Design Filename: P:\122\96\02\Tasks\13_US 281 Cable Barrier\Design\Civil\Roadway\1229502_13_RDWY14.dgn



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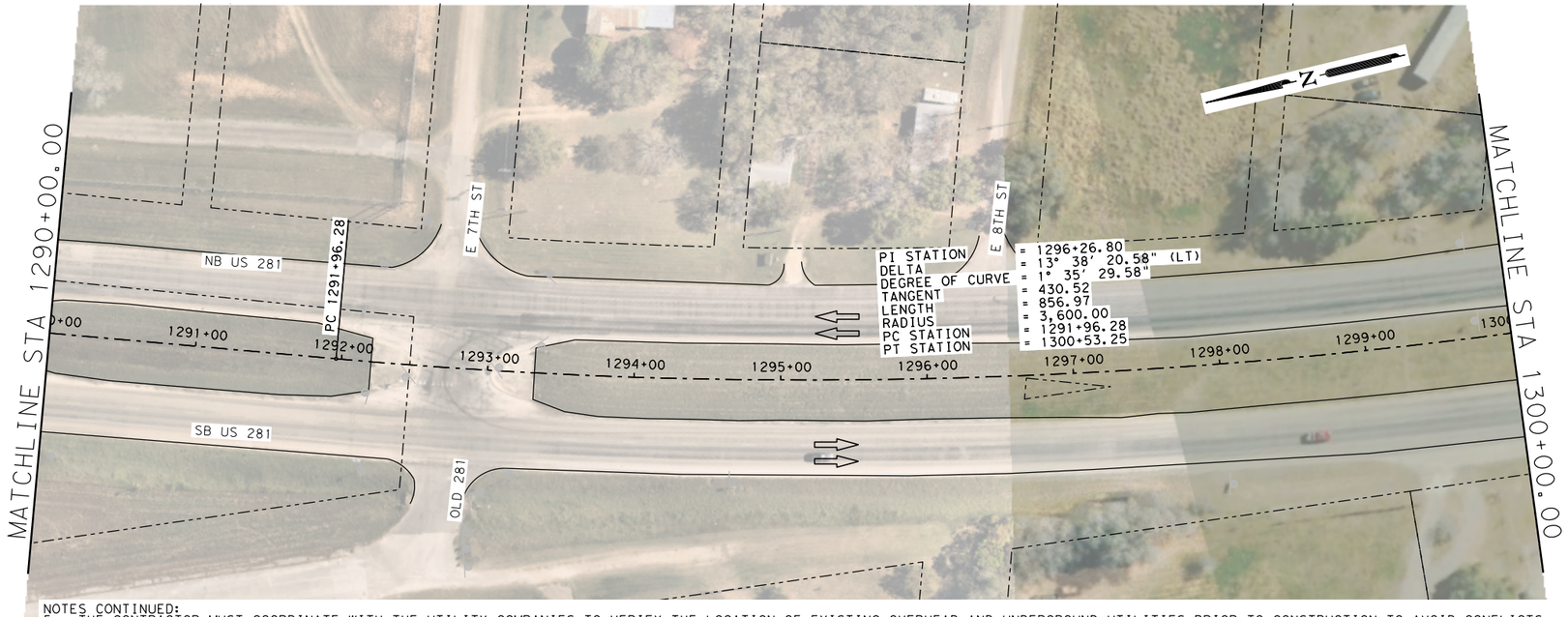

NOTES CONTINUED:
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11. FPA NOTIFICATION FOR ATASCOSA COUNTY WAS SUBMITTED IN WRITING ON MARCH, 19, 2024.

LEGEND

- OH E — EXIST OVERHEAD ELECTRIC LINE
- OH C — EXIST OVERHEAD COMMUNICATION LINE
- EXIST DRAINAGE STRUCTURE
- APPARENT R.O.W.
- PROPOSED CABLE BARRIER FENCE WITH 3' MOW STRIP
- TL-4 CABLE BARRIER TERMINAL
- TEMP SEDMT CONT FENCE
- TRAFFIC FLOW ARROWS

DESIGN

STATE OF TEXAS — JUSTIN W. CLARK — 118715 — LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 3/19/2024 DATE

APPROVAL

STATE OF TEXAS — GILMER D. GASTON — 80472 — LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 3/19/2024 DATE

0 50 100 150

SCALE: 1" = 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

US 281: CABLE BARRIER

PROPOSED CABLE BARRIER LAYOUT

STA 1280+00 TO STA 1300+00

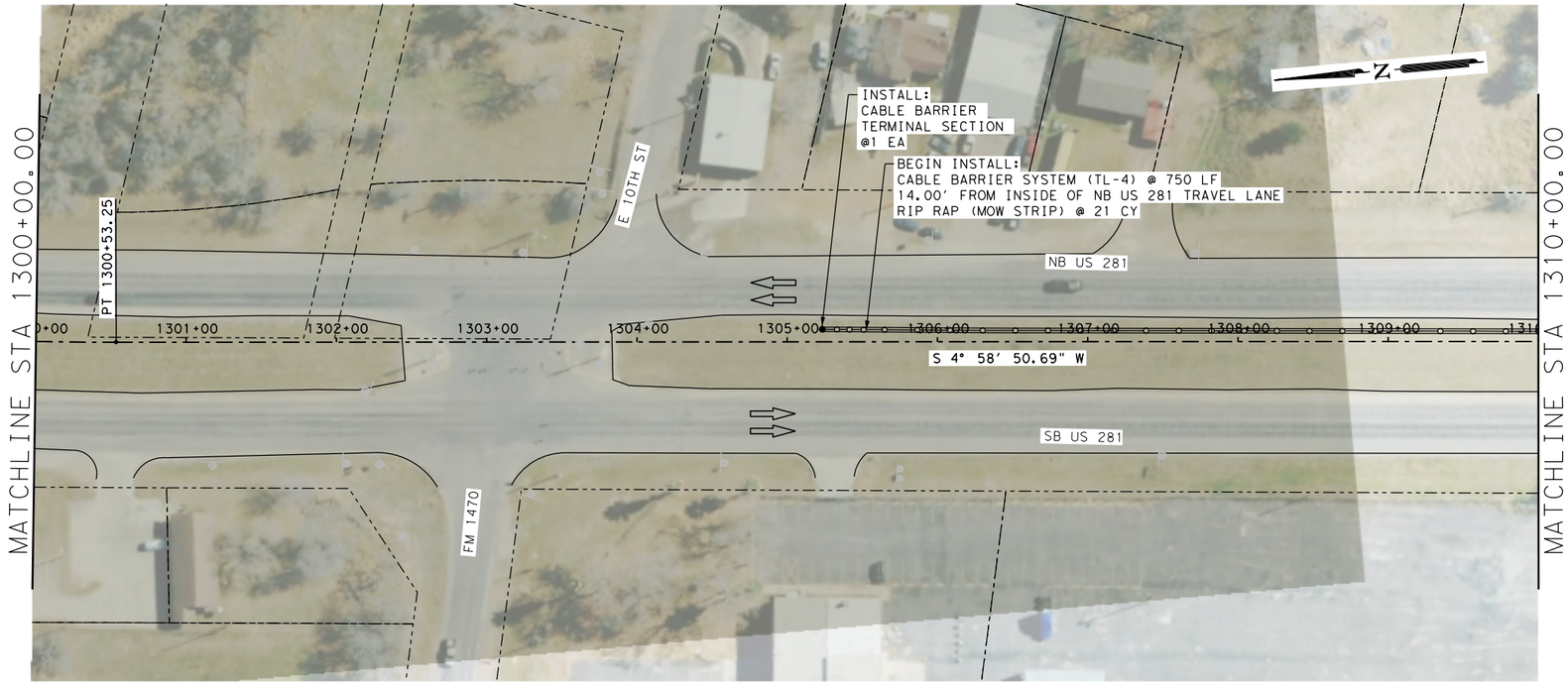
SHEET 15 OF 34

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	48

Plotted on: 3/19/2024

Design Filename: P:\122\96\02\Tasks\13_US 281 Cable Barrier\Design\Civil\Roadway\1229502_13_RDWY15.dgn

ITEM	DESCRIPTION	UNIT	QTY
0132-6021	EMBANKMENT (VEHICLE)(ORD COMP)(TY C)	CY	8
0150-6002	BLADING	HR	8.0
0164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	784
0164-6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	784
0168-6001	VEGETATIVE WATERING	MG	12.23
0169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	784
0432-6066	RIPRAP (CL A) (MOW STRIP) (3 IN)	CY	33
0506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	20
0506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	20
0543-6002	CABLE BARRIER SYSTEM (TL-4)	LF	1176
0543-6020	CABLE BARRIER TERMINAL SECTION (TL-4)	EA	3



NOTES:
1. ALL RIGHT-OF-WAY LINES ARE APPROXIMATE. VERIFY LOCATIONS AS NECESSARY
2. CABLE BARRIERS ARE DESIGNED TO BE PLACED ON 6:1 (16.67%) OR FLATTER SIDE SLOPES. TOPOGRAPHICAL SURVEYING WAS NOT PERFORMED ON THIS PROJECT. BASELINE COINCIDENCES WITH THE FLOWLINE OF DITCH. CABLE BARRIER LOCATIONS MAY BE ADJUSTED AS NEEDED TO FIT FIELD CONDITIONS AS DIRECTED BY THE ENGINEER.
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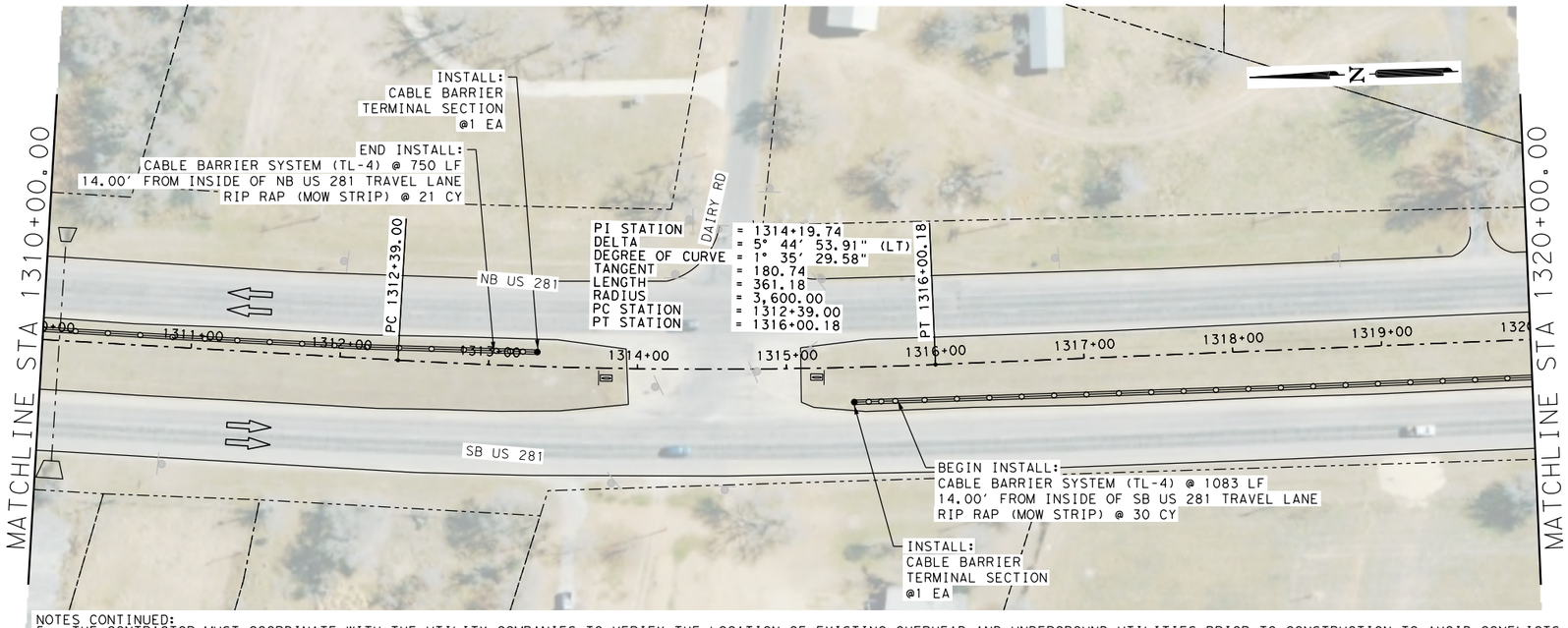

NOTES CONTINUED:
5. THE CONTRACTOR MUST COORDINATE WITH THE UTILITY COMPANIES TO VERIFY THE LOCATION OF EXISTING OVERHEAD AND UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION TO AVOID CONFLICTS WITH, OR DAMAGE TO, THESE UTILITIES.
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LEGEND

- OH E — EXIST OVERHEAD ELECTRIC LINE
- OH C — EXIST OVERHEAD COMMUNICATION LINE
- EXIST DRAINAGE STRUCTURE
- APPARENT R.O.W.
- PROPOSED CABLE BARRIER FENCE WITH 3' MOW STRIP
- TL-4 CABLE BARRIER TERMINAL
- TEMP SEDMT CONT FENCE
- TRAFFIC FLOW ARROWS

DESIGN

STATE OF TEXAS — JUSTIN W. CLARK — 118715 — LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 3/19/2024 DATE

APPROVAL

STATE OF TEXAS — GILMER D. GASTON — 80472 — LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 3/19/2024 DATE

0 50 100 150

SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

US 281: CABLE BARRIER

PROPOSED CABLE BARRIER LAYOUT

STA 1300+00 TO STA 1320+00

SHEET 16 OF 34

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	49

Plotted on: 3/19/2024

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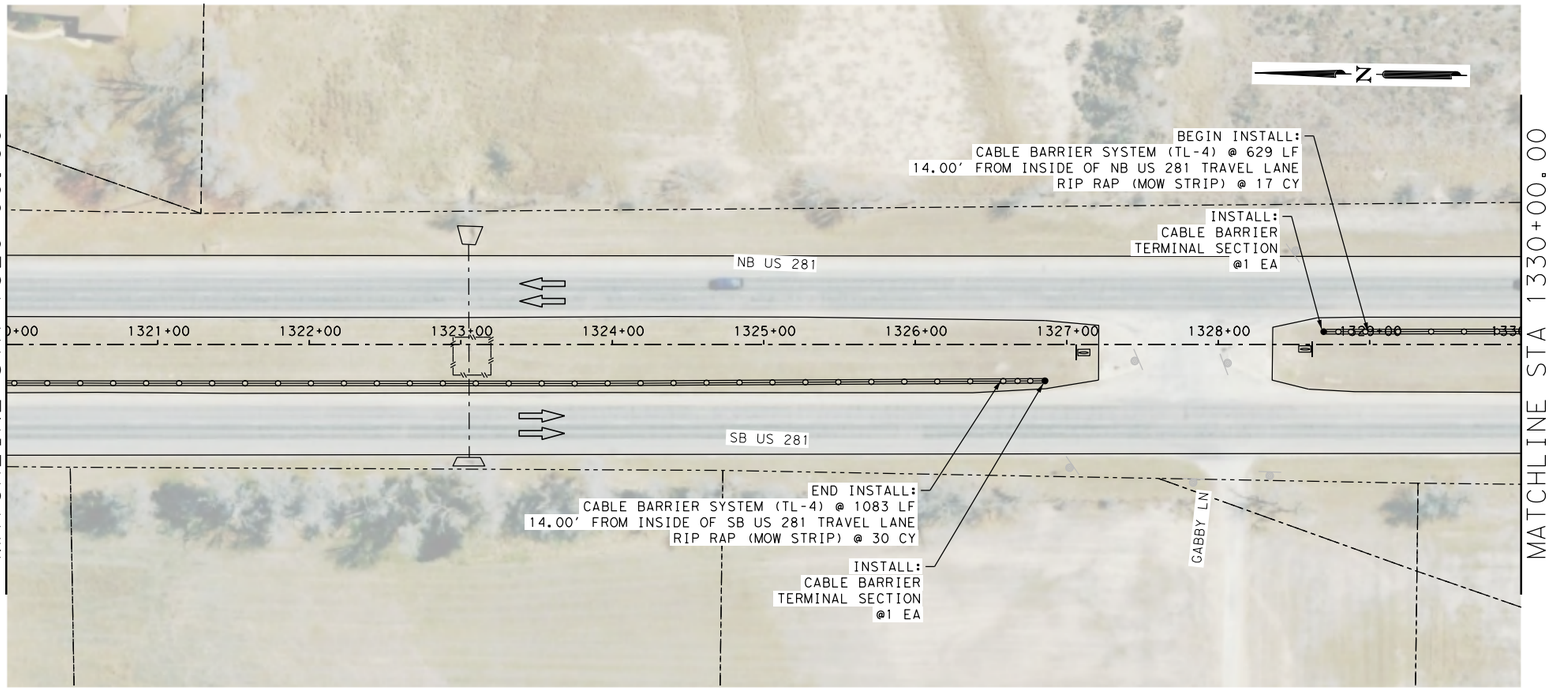

NOTES:
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2. CABLE BARRIERS ARE DESIGNED TO BE PLACED ON 6:1 (16.67%) OR FLATTER SIDE SLOPES. TOPOGRAPHICAL SURVEYING WAS NOT PERFORMED ON THIS PROJECT. BASELINE COINCIDENCES WITH THE FLOWLINE OF DITCH. CABLE BARRIER LOCATIONS MAY BE ADJUSTED AS NEEDED TO FIT FIELD CONDITIONS AS DIRECTED BY THE ENGINEER.
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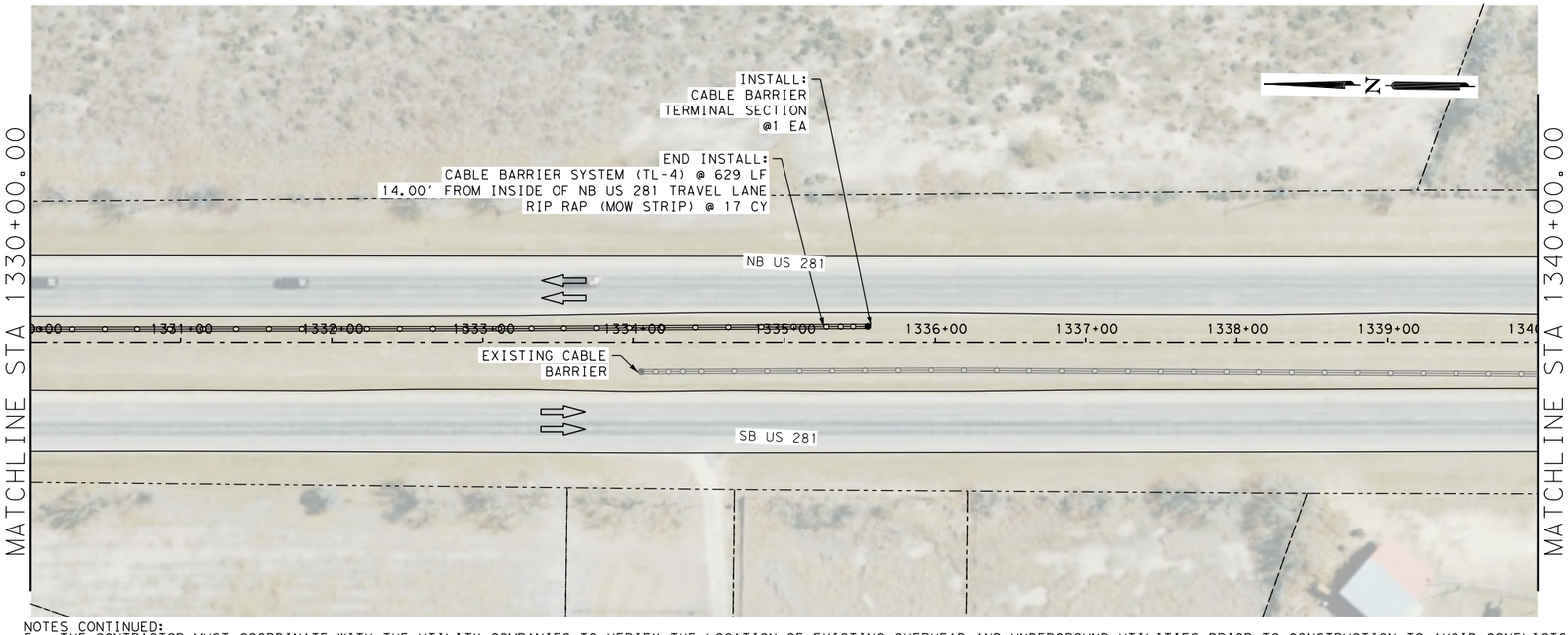


NOTES CONTINUED:
5. THE CONTRACTOR MUST COORDINATE WITH THE UTILITY COMPANIES TO VERIFY THE LOCATION OF EXISTING OVERHEAD AND UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION TO AVOID CONFLICTS WITH, OR DAMAGE TO, THESE UTILITIES.
6. STATIONING IS NOT TRUE IDENTIFICATION OF THE ROADWAY ALIGNMENT. NO TOPOGRAPHIC FILE WAS USED AS A BASIS FOR STATIONING.
7. CONTRACTOR SHALL INSTALL TEMPORARY SEDIMENT CONTROL FENCES AS NEEDED (NOT SHOWN ON PLANS)
8. MOW STRIP SHALL BE 36 INCHES WIDE UNLESS OTHERWISE SPECIFIED BE THE ENGINEER.
9. DRILL SEEDING AND SOIL RETENTION BLANKETS SHALL BE APPLIED AT A MINIMUM OF 3 FEET ON EITHER SIDE OF CABLE BARRIER MOW STRIP FOR A TOTAL WIDTH OF 6 FEET.
10. NO WORK THAT COULD HAVE AN IMPACT TO THE EXISTING FEMA 100YR WSEL IS BEING PROPOSED FOR THIS PROJECT.
11. FPA NOTIFICATION FOR ATASCOSA COUNTY WAS SUBMITTED IN WRITING ON MARCH, 19, 2024.

ITEM	DESCRIPTION	UNIT	QTY
0132-6021	EMBANKMENT (VEHICLE)(ORD COMP)(TY C)	CY	9
0150-6002	BLADING	HR	8.0
0164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	857
0164-6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	857
0168-6001	VEGETATIVE WATERING	MG	13.37
0169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	857
0432-6066	RIPRAP (CL A) (MOW STRIP) (3 IN)	CY	36
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	100
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	100
0506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	20
0506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	20
0543-6002	CABLE BARRIER SYSTEM (TL-4)	LF	1285
0543-6020	CABLE BARRIER TERMINAL SECTION (TL-4)	EA	3

LEGEND

- OH E — EXIST OVERHEAD ELECTRIC LINE
- OH C — EXIST OVERHEAD COMMUNICATION LINE
- EXIST DRAINAGE STRUCTURE
- APPARENT R.O.W.
- PROPOSED CABLE BARRIER FENCE WITH 3' MOW STRIP
- TL-4 CABLE BARRIER TERMINAL
- TEMP SEDMT CONT FENCE
- TRAFFIC FLOW ARROWS

DESIGN

STATE OF TEXAS — JUSTIN W. CLARK — 118715 — LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 3/19/2024 DATE

APPROVAL

STATE OF TEXAS — GILMER D. GASTON — 80472 — LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 3/19/2024 DATE

0 50 100 150

SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

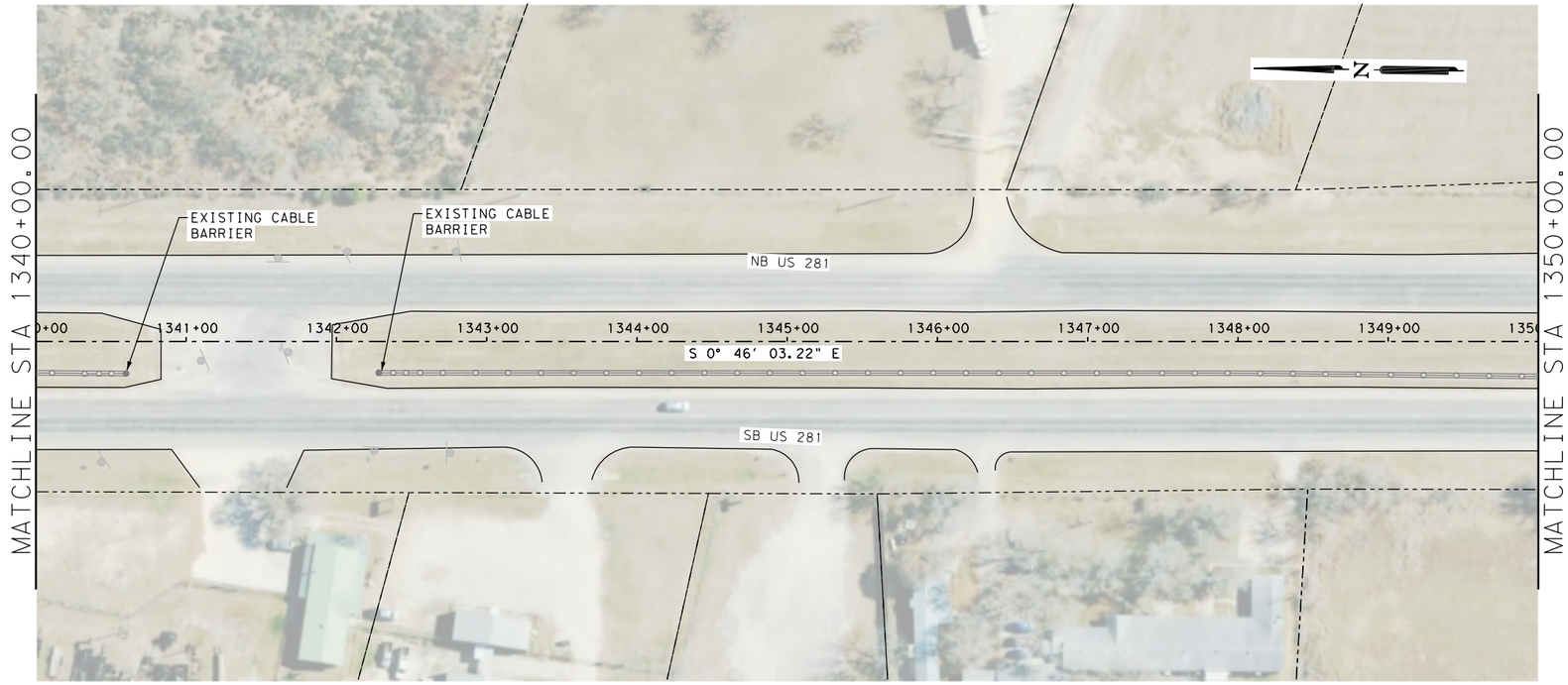
US 281: CABLE BARRIER

PROPOSED CABLE BARRIER LAYOUT

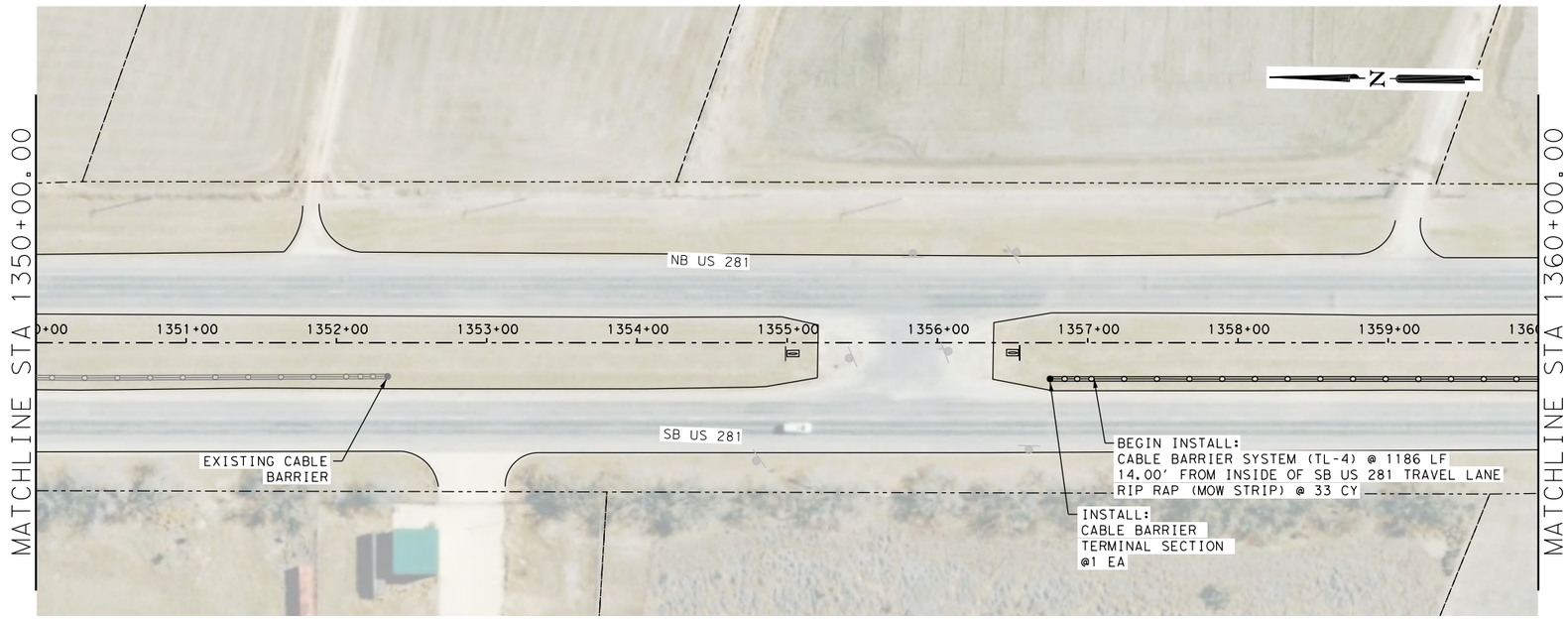
STA 1320+00 TO STA 1340+00

SHEET 17 OF 34

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	50



NOTES:
1. ALL RIGHT-OF-WAY LINES ARE APPROXIMATE. VERIFY LOCATIONS AS NECESSARY
2. CABLE BARRIERS ARE DESIGNED TO BE PLACED ON 6:1 (16.67%) OR FLATTER SIDE SLOPES. TOPOGRAPHICAL SURVEYING WAS NOT PERFORMED ON THIS PROJECT. BASELINE COINCIDENCES WITH THE FLOWLINE OF DITCH. CABLE BARRIER LOCATIONS MAY BE ADJUSTED AS NEEDED TO FIT FIELD CONDITIONS AS DIRECTED BY THE ENGINEER.
3. CABLE BARRIERS SHALL BE PLACED WITH AT LEAST 12 FEET OFFSET FROM EDGE OF THE TRAVEL LANE. CABLE BARRIERS SHALL BE PLACED AT LEAST 8 FEET FROM THE BOTTOM OF THE DITCHLINE. OFFSET OF AT LEAST 5 FEET FROM THE EDGE OF ILLUMINATION POLE IS RECCOMMENDED.
4. UTILITY LOCATIONS ARE APPROXIMATE. ALL UTILITIES ARE SHOWN BASED ON AVAILABLE AS-BUILT DRAWINGS AND 811 UTILITY LOCATE. CONTRACTOR MUST FIELD VERIFY THE EXACT LOCATION OF EXISTING ROW, POLES, ELECTRICAL SERVICES, GROUND BOXES, AND OTHER PERTINENT ITEMS BEFORE COMMENCING WORK.



NOTES CONTINUED:
5. THE CONTRACTOR MUST COORDINATE WITH THE UTILITY COMPANIES TO VERIFY THE LOCATION OF EXISTING OVERHEAD AND UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION TO AVOID CONFLICTS WITH, OR DAMAGE TO, THESE UTILITIES.
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11. FPA NOTIFICATION FOR ATASCOSA COUNTY WAS SUBMITTED IN WRITING ON MARCH, 19, 2024.

ITEM	DESCRIPTION	UNIT	QTY
0132-6021	EMBANKMENT (VEHICLE)(ORD COMP)(TY C)	CY	2
0150-6002	BLADING	HR	5.0
0164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	197
0164-6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	197
0168-6001	VEGETATIVE WATERING	MG	3.07
0169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	197
0432-6066	RIPRAP (CL A) (MOW STRIP) (3 IN)	CY	8
0506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	20
0506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	20
0543-6002	CABLE BARRIER SYSTEM (TL-4)	LF	296
0543-6020	CABLE BARRIER TERMINAL SECTION (TL-4)	EA	1

LEGEND

- OH E — EXIST OVERHEAD ELECTRIC LINE
- OH C — EXIST OVERHEAD COMMUNICATION LINE
- EXIST DRAINAGE STRUCTURE
- APPARENT R.O.W.
- PROPOSED CABLE BARRIER FENCE WITH 3' MOW STRIP
- TL-4 CABLE BARRIER TERMINAL
- TEMP SEDMT CONT FENCE
- TRAFFIC FLOW ARROWS

DESIGN

STATE OF TEXAS — JUSTIN W. CLARK — 118715 — LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 3/19/2024 DATE

APPROVAL

STATE OF TEXAS — GILMER D. GASTON — 80472 — LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 3/19/2024 DATE

0 50 100 150

SCALE: 1" = 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

US 281: CABLE BARRIER

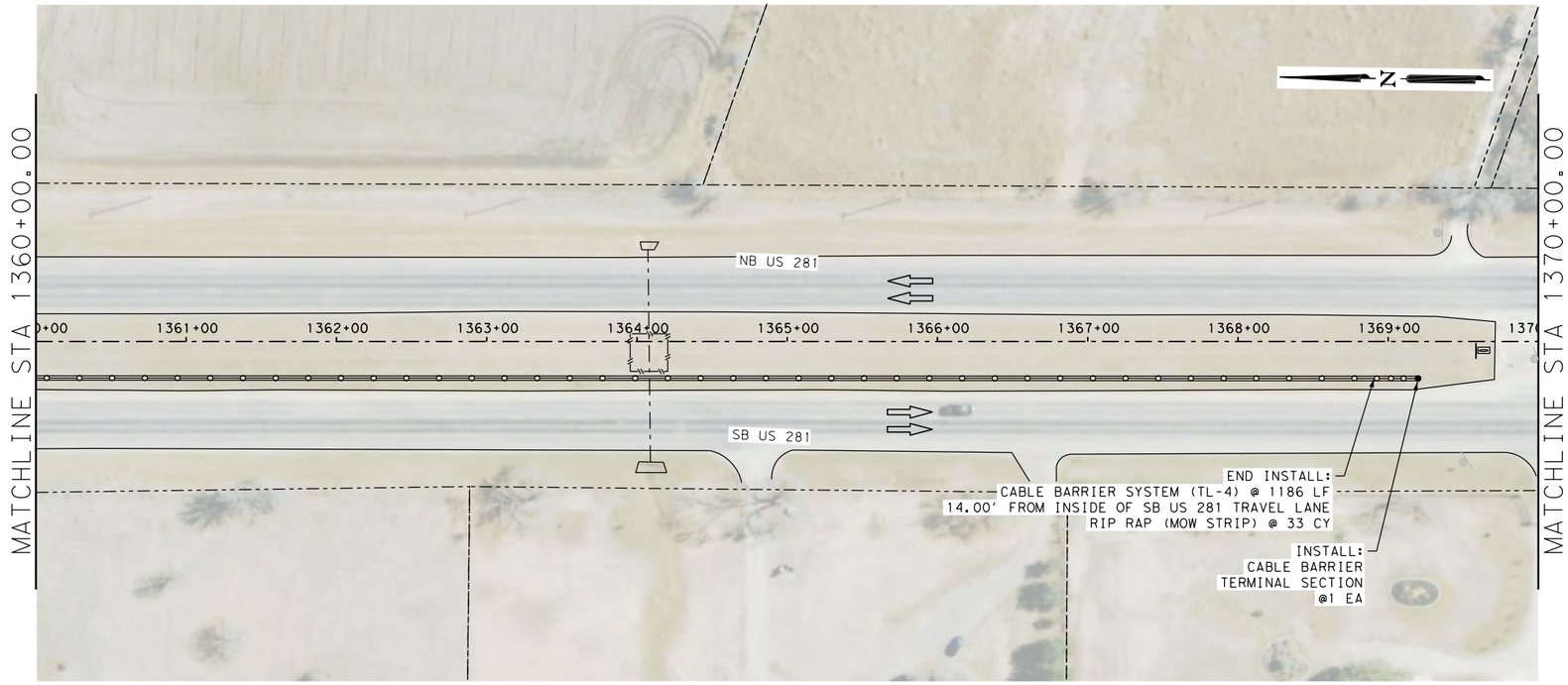
PROPOSED CABLE BARRIER LAYOUT

STA 1340+00 TO STA 1360+00

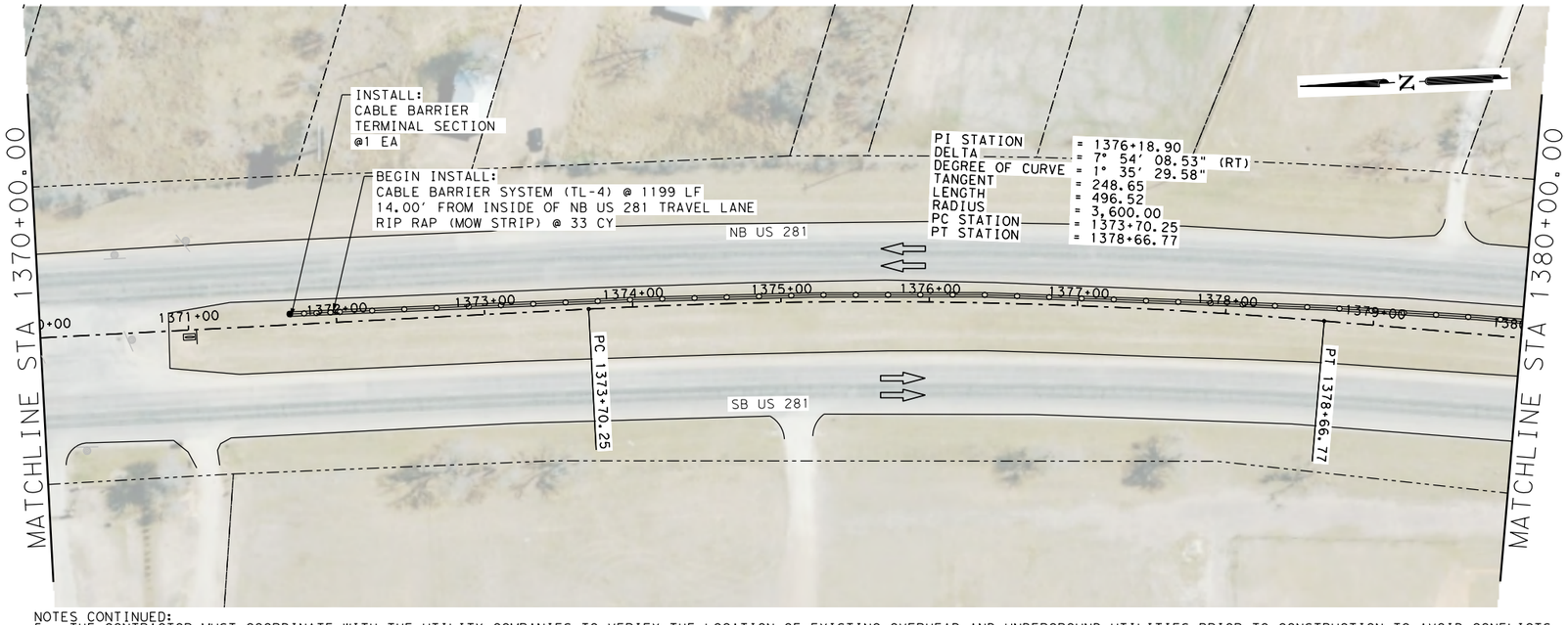
SHEET 18 OF 34

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	51

ITEM	DESCRIPTION	UNIT	QTY
0132-6021	EMBANKMENT (VEHICLE)(ORD COMP)(TY C)	CY	12
0150-6002	BLADING	HR	9.0
0164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	1129
0164-6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	1129
0168-6001	VEGETATIVE WATERING	MG	17.61
0169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	1129
0432-6066	RIPRAP (CL A) (MOW STRIP) (3 IN)	CY	47
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	100
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	100
0506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	20
0506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	20
0543-6002	CABLE BARRIER SYSTEM (TL-4)	LF	1694
0543-6020	CABLE BARRIER TERMINAL SECTION (TL-4)	EA	2



NOTES:
1. ALL RIGHT-OF-WAY LINES ARE APPROXIMATE. VERIFY LOCATIONS AS NECESSARY
2. CABLE BARRIERS ARE DESIGNED TO BE PLACED ON 6:1 (16.67%) OR FLATTER SIDE SLOPES. TOPOGRAPHICAL SURVEYING WAS NOT PERFORMED ON THIS PROJECT. BASELINE COINCIDENCES WITH THE FLOWLINE OF DITCH. CABLE BARRIER LOCATIONS MAY BE ADJUSTED AS NEEDED TO FIT FIELD CONDITIONS AS DIRECTED BY THE ENGINEER.
3. CABLE BARRIERS SHALL BE PLACED WITH AT LEAST 12 FEET OFFSET FROM EDGE OF THE TRAVEL LANE. CABLE BARRIERS SHALL BE PLACED AT LEAST 8 FEET FROM THE BOTTOM OF THE DITCHLINE. OFFSET OF AT LEAST 5 FEET FROM THE EDGE OF ILLUMINATION POLE IS RECCOMMENDED.
4. UTILITY LOCATIONS ARE APPROXIMATE. ALL UTILITIES ARE SHOWN BASED ON AVAILABLE AS-BUILT DRAWINGS AND 811 UTILITY LOCATE. CONTRACTOR MUST FIELD VERIFY THE EXACT LOCATION OF EXISTING ROW, POLES, ELECTRICAL SERVICES, GROUND BOXES, AND OTHER PERTINENT ITEMS BEFORE COMMENCING WORK.



NOTES CONTINUED:
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11. FPA NOTIFICATION FOR ATASCOSA COUNTY WAS SUBMITTED IN WRITING ON MARCH, 19, 2024.

LEGEND

- OH E — EXIST OVERHEAD ELECTRIC LINE
- OH C — EXIST OVERHEAD COMMUNICATION LINE
- EXIST DRAINAGE STRUCTURE
- APPARENT R.O.W.
- PROPOSED CABLE BARRIER FENCE WITH 3' MOW STRIP
- TL-4 CABLE BARRIER TERMINAL
- TEMP SEDMT CONT FENCE
- TRAFFIC FLOW ARROWS

DESIGN

JUSTIN W. CLARK, 118715, LICENSED PROFESSIONAL ENGINEER, STATE OF TEXAS

JUSTIN W. CLARK, P.E. — 3/19/2024 DATE

APPROVAL

GILMER D. GASTON, 80472, LICENSED PROFESSIONAL ENGINEER, STATE OF TEXAS

GILMER D. GASTON, P.E. — 3/19/2024 DATE

0 50 100 150

SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

US 281: CABLE BARRIER

PROPOSED CABLE BARRIER LAYOUT

STA 1360+00 TO STA 1380+00

SHEET 19 OF 34

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	52

Plotted on: 3/19/2024

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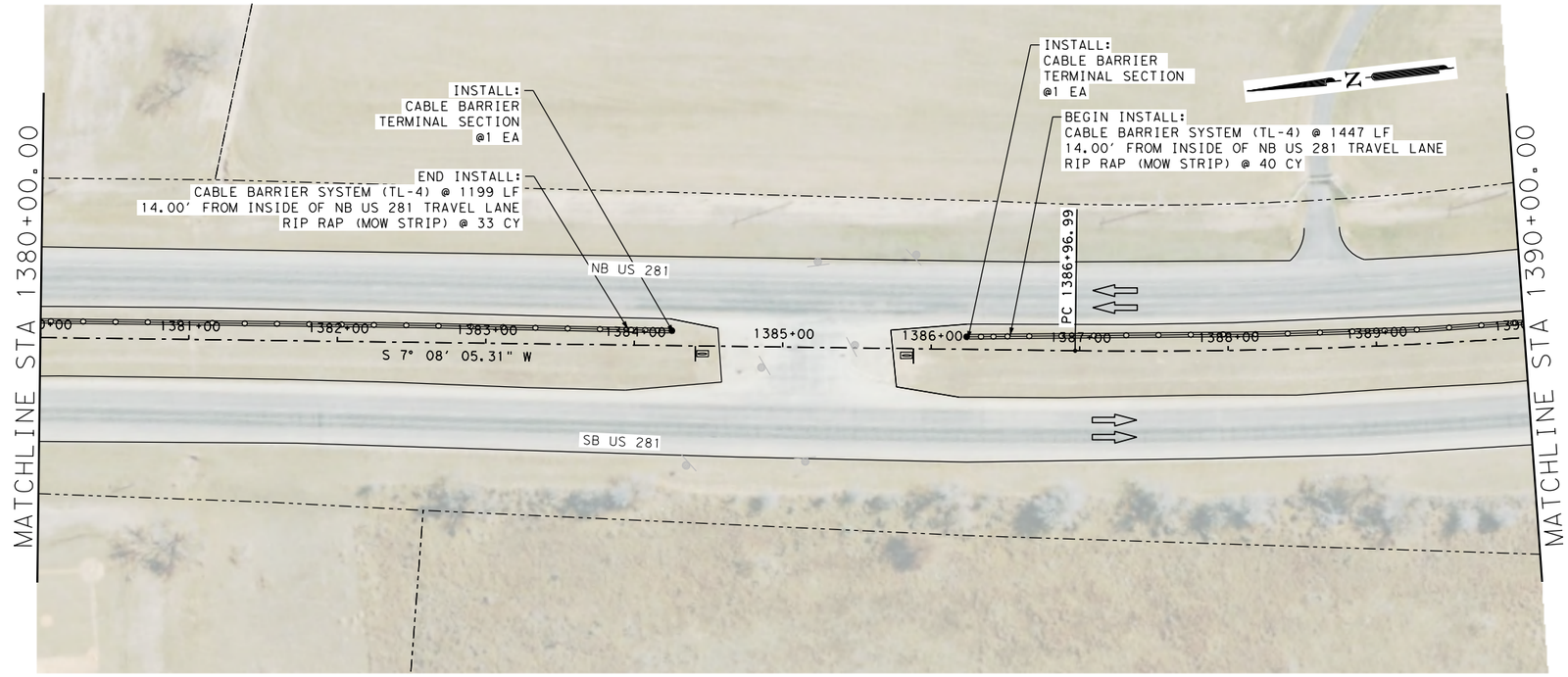

ITEM	DESCRIPTION	UNIT	QTY
0132-6021	EMBANKMENT (VEHICLE)(ORD COMP)(TY C)	CY	12
0150-6002	BLADING	HR	10.0
0164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	1160
0164-6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	1160
0168-6001	VEGETATIVE WATERING	MG	18.10
0169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	1160
0432-6066	RIPRAP (CL A) (MOW STRIP) (3 IN)	CY	48
0506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	20
0506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	20
0543-6002	CABLE BARRIER SYSTEM (TL-4)	LF	1740
0543-6020	CABLE BARRIER TERMINAL SECTION (TL-4)	EA	2

NOTES:
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2. CABLE BARRIERS ARE DESIGNED TO BE PLACED ON 6:1 (16.67%) OR FLATTER SIDE SLOPES. TOPOGRAPHICAL SURVEYING WAS NOT PERFORMED ON THIS PROJECT. BASELINE COINCIDENCES WITH THE FLOWLINE OF DITCH. CABLE BARRIER LOCATIONS MAY BE ADJUSTED AS NEEDED TO FIT FIELD CONDITIONS AS DIRECTED BY THE ENGINEER.
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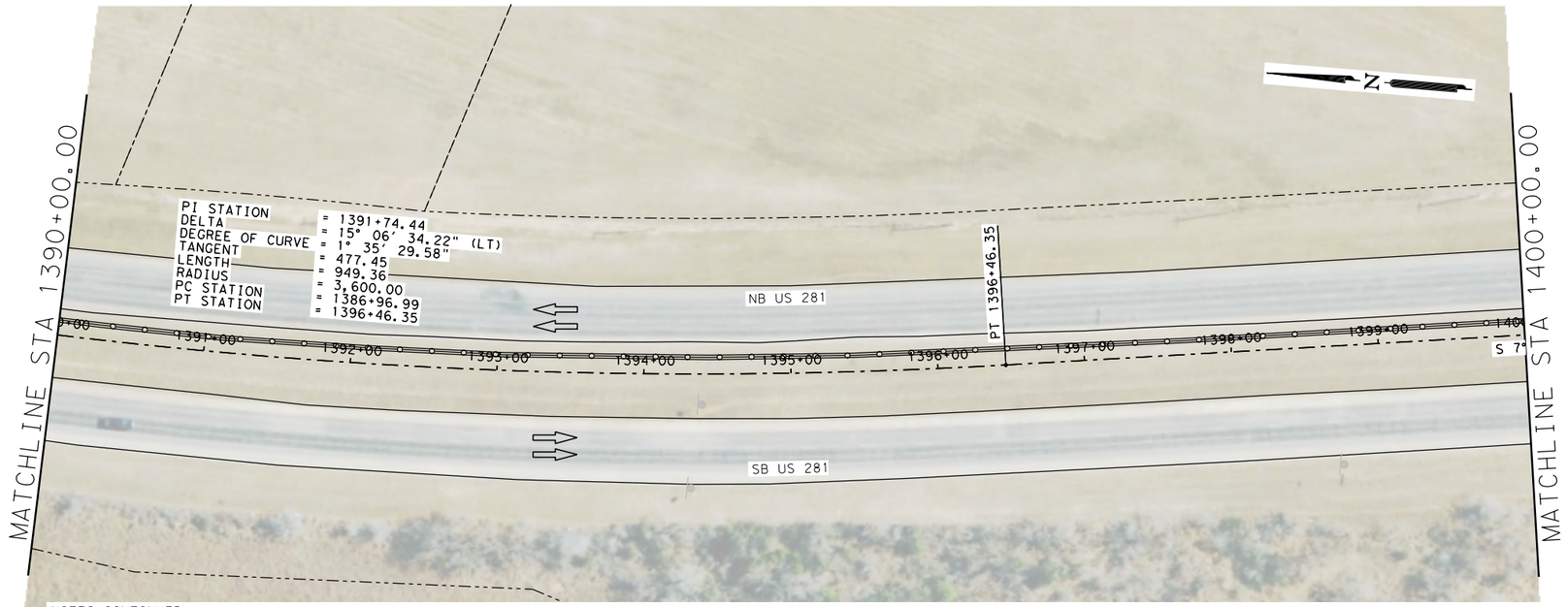

NOTES CONTINUED:
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11. FPA NOTIFICATION FOR ATASCOSA COUNTY WAS SUBMITTED IN WRITING ON MARCH,19,2024.

LEGEND

- OH E — EXIST OVERHEAD ELECTRIC LINE
- OH C — EXIST OVERHEAD COMMUNICATION LINE
- EXIST DRAINAGE STRUCTURE
- APPARENT R.O.W.
- PROPOSED CABLE BARRIER FENCE WITH 3' MOW STRIP
- TL-4 CABLE BARRIER TERMINAL
- TEMP SEDMT CONT FENCE
- TRAFFIC FLOW ARROWS

DESIGN

STATE OF TEXAS — JUSTIN W. CLARK — 118715 — LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 3/19/2024 DATE

APPROVAL

STATE OF TEXAS — GILMER D. GASTON — 80472 — LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 3/19/2024 DATE

0 50 100 150

SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

US 281: CABLE BARRIER

PROPOSED CABLE BARRIER LAYOUT

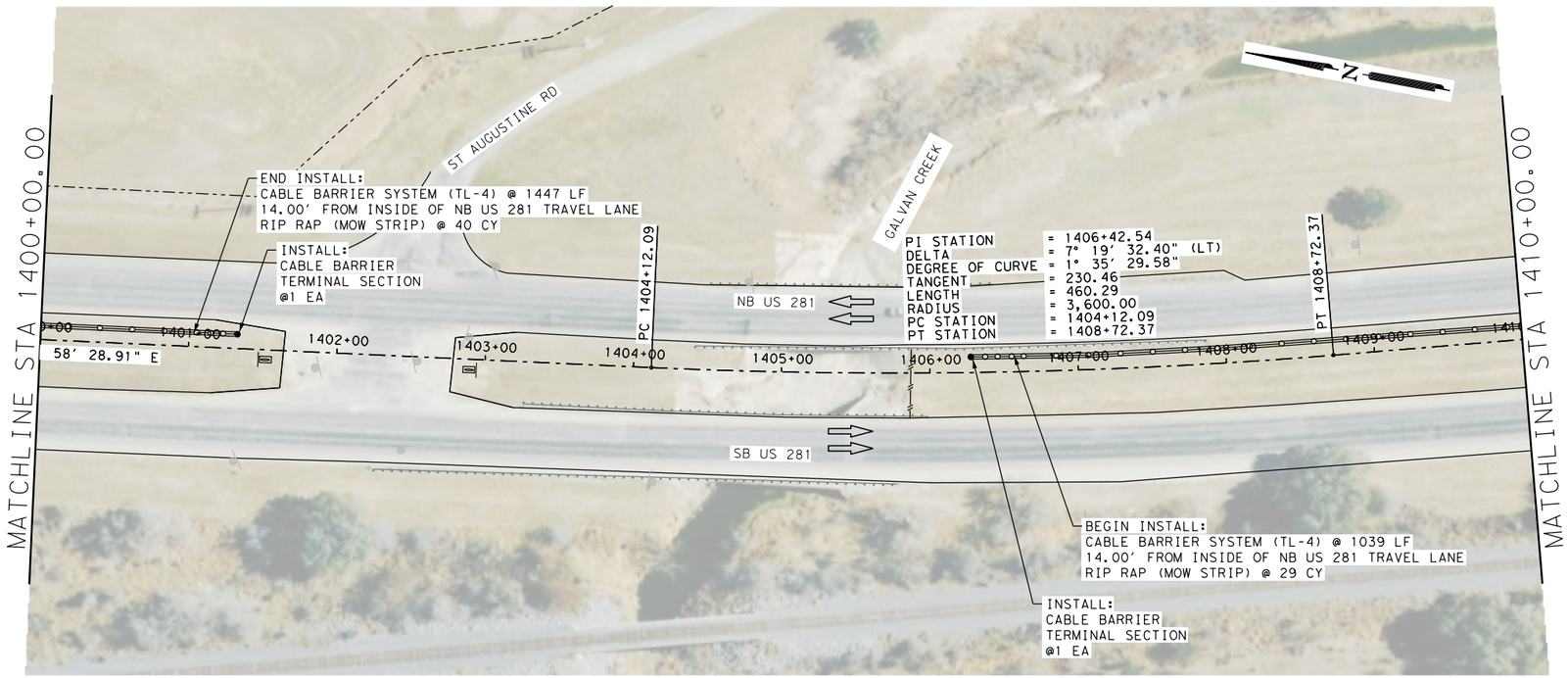
STA 1380+00 TO STA 1400+00

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	53

Plotted on: 3/19/2024

Design Filename: P:\122\96\02\Tasks\13_US 281 Cable Barrier\Design\Civil\Roadway\1229502_13_RDWY20.dgn

ITEM	DESCRIPTION	UNIT	QTY
0132-6021	EMBANKMENT (VEHICLE)(ORD COMP)(TY C)	CY	8
0150-6002	BLADING	HR	8.0
0164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	761
0164-6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	761
0168-6001	VEGETATIVE WATERING	MG	11.87
0169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	761
0432-6066	RIPRAP (CL A) (MOW STRIP) (3 IN)	CY	32
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	48
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	48
0506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	40
0506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	40
0543-6002	CABLE BARRIER SYSTEM (TL-4)	LF	1142
0543-6020	CABLE BARRIER TERMINAL SECTION (TL-4)	EA	4



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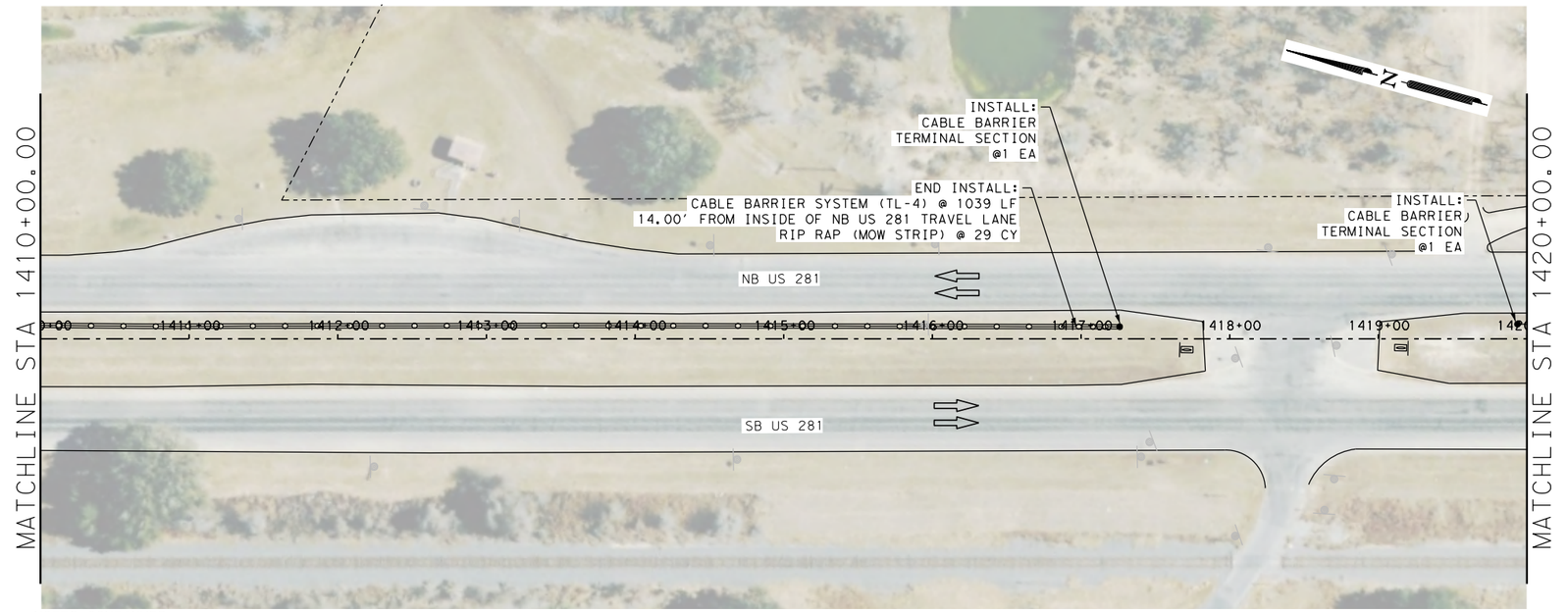

NOTES CONTINUED:
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LEGEND

- OH E — EXIST OVERHEAD ELECTRIC LINE
- OH C — EXIST OVERHEAD COMMUNICATION LINE
- EXIST DRAINAGE STRUCTURE
- APPARENT R.O.W.
- PROPOSED CABLE BARRIER FENCE WITH 3' MOW STRIP
- TL-4 CABLE BARRIER TERMINAL
- TEMP SEDMT CONT FENCE
- TRAFFIC FLOW ARROWS

DESIGN

STATE OF TEXAS — JUSTIN W. CLARK — 118715 — LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 3/19/2024 DATE

APPROVAL

STATE OF TEXAS — GILMER D. GASTON — 80472 — LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 3/19/2024 DATE

0 50 100 150

SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

US 281: CABLE BARRIER

PROPOSED CABLE BARRIER LAYOUT

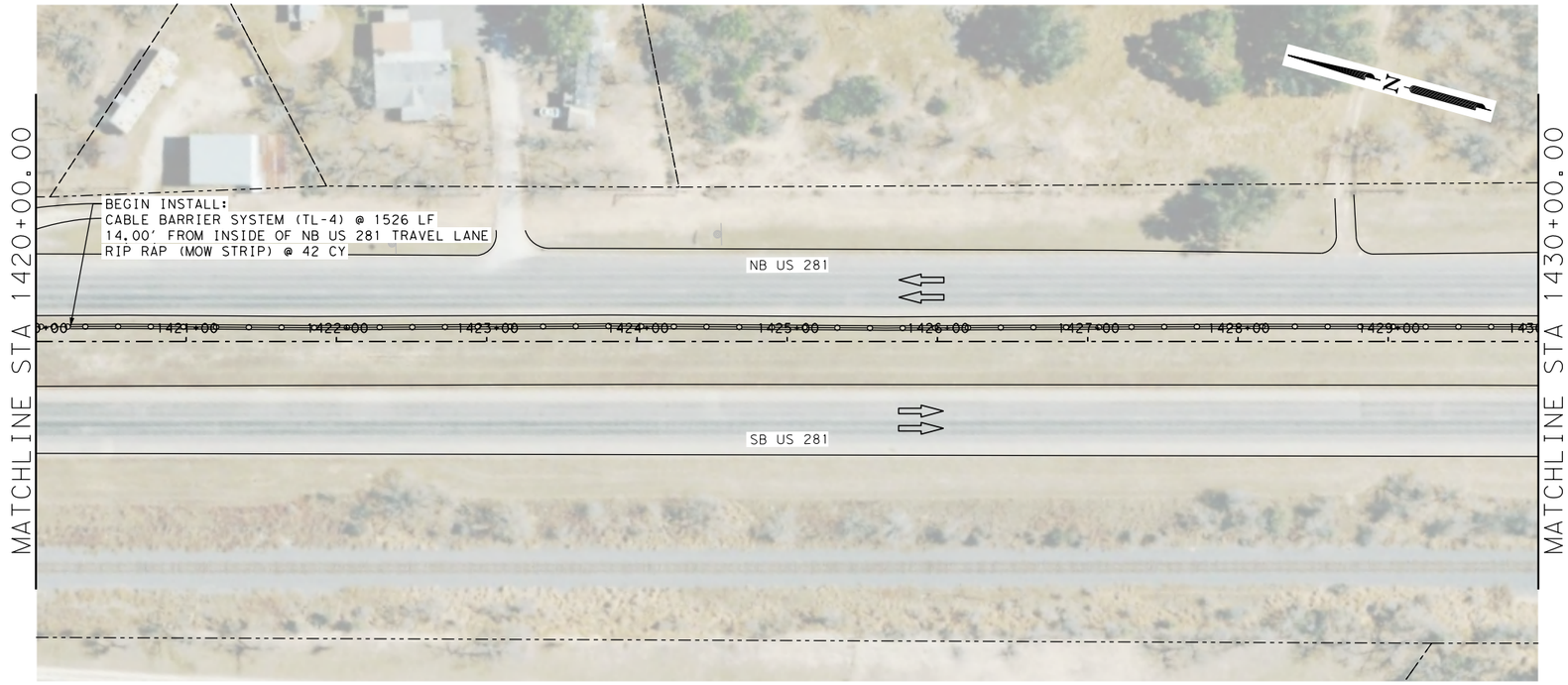
STA 1400+00 TO STA 1420+00

SHEET 21 OF 34

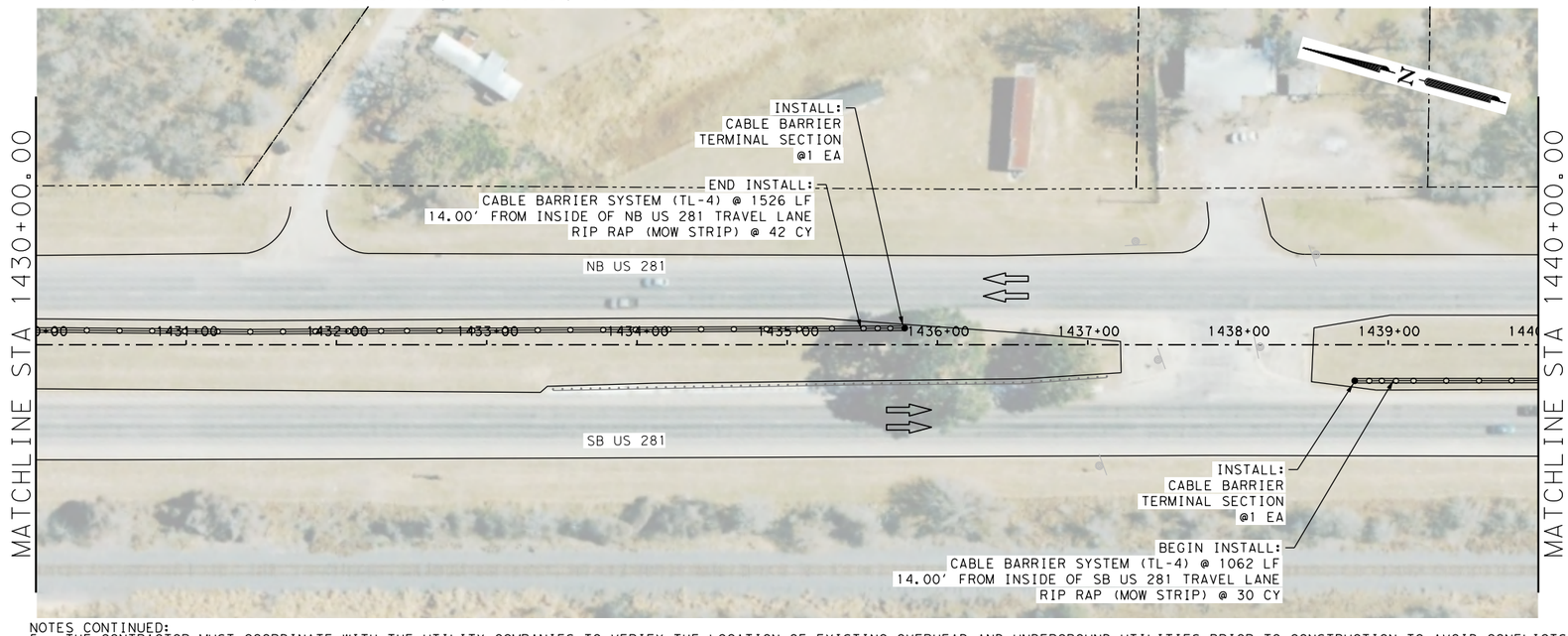
DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	54

Plotted on: 3/19/2024

Design Filename: P:\122.96\02\Tasks\13_US 281 Cable Barrier\Design\Civil\Roadway\1229502_13_RDWY21.dgn



NOTES:
1. ALL RIGHT-OF-WAY LINES ARE APPROXIMATE. VERIFY LOCATIONS AS NECESSARY
2. CABLE BARRIERS ARE DESIGNED TO BE PLACED ON 6:1 (16.67%) OR FLATTER SIDE SLOPES. TOPOGRAPHICAL SURVEYING WAS NOT PERFORMED ON THIS PROJECT. BASELINE COINCIDENCES WITH THE FLOWLINE OF DITCH. CABLE BARRIER LOCATIONS MAY BE ADJUSTED AS NEEDED TO FIT FIELD CONDITIONS AS DIRECTED BY THE ENGINEER.
3. CABLE BARRIERS SHALL BE PLACED WITH AT LEAST 12 FEET OFFSET FROM EDGE OF THE TRAVEL LANE. CABLE BARRIERS SHALL BE PLACED AT LEAST 8 FEET FROM THE BOTTOM OF THE DITCHLINE. OFFSET OF AT LEAST 5 FEET FROM THE EDGE OF ILLUMINATION POLE IS RECCOMMENDED.
4. UTILITY LOCATIONS ARE APPROXIMATE. ALL UTILITIES ARE SHOWN BASED ON AVAILABLE AS-BUILT DRAWINGS AND 811 UTILITY LOCATE. CONTRACTOR MUST FIELD VERIFY THE EXACT LOCATION OF EXISTING ROW, POLES, ELECTRICAL SERVICES, GROUND BOXES, AND OTHER PERTINENT ITEMS BEFORE COMMENCING WORK.



NOTES CONTINUED:
5. THE CONTRACTOR MUST COORDINATE WITH THE UTILITY COMPANIES TO VERIFY THE LOCATION OF EXISTING OVERHEAD AND UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION TO AVOID CONFLICTS WITH, OR DAMAGE TO, THESE UTILITIES.
6. STATIONING IS NOT TRUE IDENTIFICATION OF THE ROADWAY ALIGNMENT. NO TOPOGRAPHIC FILE WAS USED AS A BASIS FOR STATIONING.
7. CONTRACTOR SHALL INSTALL TEMPORARY SEDIMENT CONTROL FENCES AS NEEDED (NOT SHOWN ON PLANS)
8. MOW STRIP SHALL BE 36 INCHES WIDE UNLESS OTHERWISE SPECIFIED BE THE ENGINEER.
9. DRILL SEEDING AND SOIL RETENTION BLANKETS SHALL BE APPLIED AT A MINIMUM OF 3 FEET ON EITHER SIDE OF CABLE BARRIER MOW STRIP FOR A TOTAL WIDTH OF 6 FEET.
10. NO WORK THAT COULD HAVE AN IMPACT TO THE EXISTING FEMA 100YR WSEL IS BEING PROPOSED FOR THIS PROJECT.
11. FPA NOTIFICATION FOR ATASCOSA COUNTY WAS SUBMITTED IN WRITING ON MARCH, 19, 2024.

ITEM	DESCRIPTION	UNIT	QTY
0132-6021	EMBANKMENT (VEHICLE)(ORD COMP)(TY C)	CY	11
0150-6002	BLADING	HR	8.0
0164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	1079
0164-6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	1079
0168-6001	VEGETATIVE WATERING	MG	16.83
0169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	1079
0432-6066	RIPRAP (CL A) (MOW STRIP) (3 IN)	CY	45
0543-6002	CABLE BARRIER SYSTEM (TL-4)	LF	1619
0543-6020	CABLE BARRIER TERMINAL SECTION (TL-4)	EA	2

LEGEND

- OH E — EXIST OVERHEAD ELECTRIC LINE
- OH C — EXIST OVERHEAD COMMUNICATION LINE
- EXIST DRAINAGE STRUCTURE
- APPARENT R.O.W.
- PROPOSED CABLE BARRIER FENCE WITH 3' MOW STRIP
- TL-4 CABLE BARRIER TERMINAL
- TEMP SEDMT CONT FENCE
- TRAFFIC FLOW ARROWS

DESIGN

STATE OF TEXAS — JUSTIN W. CLARK — 118715 — LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 3/19/2024 DATE

APPROVAL

STATE OF TEXAS — GILMER D. GASTON — 80472 — LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 3/19/2024 DATE

0 50 100 150

SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

US 281: CABLE BARRIER

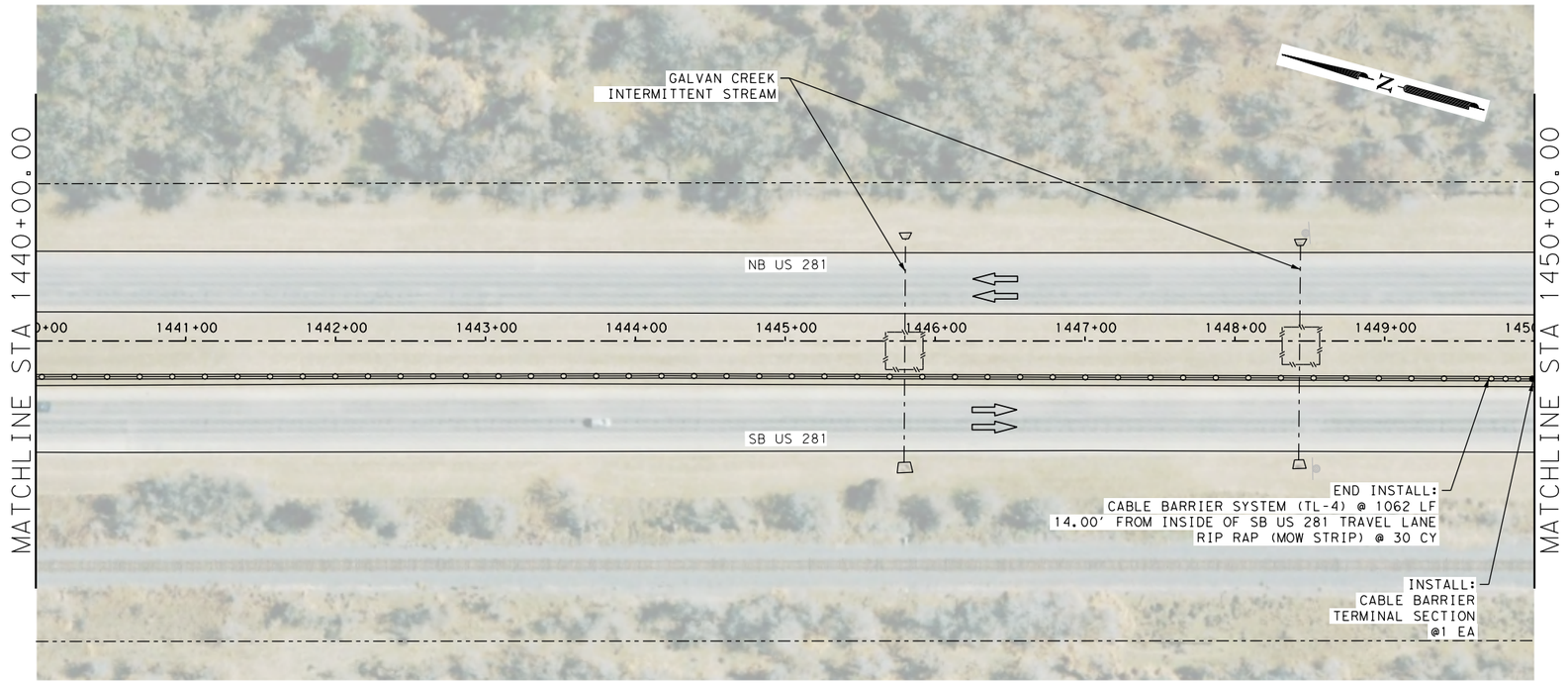
PROPOSED CABLE BARRIER LAYOUT

STA 1420+00 TO STA 1400+00

SHEET 22 OF 34

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	55

ITEM	DESCRIPTION	UNIT	QTY
0132-6021	EMBANKMENT (VEHICLE)(ORD COMP)(TY C)	CY	7
0150-6002	BLADING	HR	8.0
0164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	646
0164-6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	646
0168-6001	VEGETATIVE WATERING	MG	10.08
0169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	646
0432-6066	RIPRAP (CL A) (MOW STRIP) (3 IN)	CY	27
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	300
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	300
0543-6002	CABLE BARRIER SYSTEM (TL-4)	LF	969
0543-6020	CABLE BARRIER TERMINAL SECTION (TL-4)	EA	1



NOTES:
1. ALL RIGHT-OF-WAY LINES ARE APPROXIMATE. VERIFY LOCATIONS AS NECESSARY
2. CABLE BARRIERS ARE DESIGNED TO BE PLACED ON 6:1 (16.67%) OR FLATTER SIDE SLOPES. TOPOGRAPHICAL SURVEYING WAS NOT PERFORMED ON THIS PROJECT. BASELINE COINCIDENCES WITH THE FLOWLINE OF DITCH. CABLE BARRIER LOCATIONS MAY BE ADJUSTED AS NEEDED TO FIT FIELD CONDITIONS AS DIRECTED BY THE ENGINEER.
3. CABLE BARRIERS SHALL BE PLACED WITH AT LEAST 12 FEET OFFSET FROM EDGE OF THE TRAVEL LANE. CABLE BARRIERS SHALL BE PLACED AT LEAST 8 FEET FROM THE BOTTOM OF THE DITCHLINE. OFFSET OF AT LEAST 5 FEET FROM THE EDGE OF ILLUMINATION POLE IS RECCOMMENDED.
4. UTILITY LOCATIONS ARE APPROXIMATE. ALL UTILITIES ARE SHOWN BASED ON AVAILABLE AS-BUILT DRAWINGS AND 811 UTILITY LOCATE. CONTRACTOR MUST FIELD VERIFY THE EXACT LOCATION OF EXISTING ROW, POLES, ELECTRICAL SERVICES, GROUND BOXES, AND OTHER PERTINENT ITEMS BEFORE COMMENCING WORK.

NOTES CONTINUED:
5. THE CONTRACTOR MUST COORDINATE WITH THE UTILITY COMPANIES TO VERIFY THE LOCATION OF EXISTING OVERHEAD AND UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION TO AVOID CONFLICTS WITH, OR DAMAGE TO, THESE UTILITIES.
6. STATIONING IS NOT TRUE IDENTIFICATION OF THE ROADWAY ALIGNMENT. NO TOPOGRAPHIC FILE WAS USED AS A BASIS FOR STATIONING.
7. CONTRACTOR SHALL INSTALL TEMPORARY SEDIMENT CONTROL FENCES AS NEEDED (NOT SHOWN ON PLANS)
8. MOW STRIP SHALL BE 36 INCHES WIDE UNLESS OTHERWISE SPECIFIED BE THE ENGINEER.
9. DRILL SEEDING AND SOIL RETENTION BLANKETS SHALL BE APPLIED AT A MINIMUM OF 3 FEET ON EITHER SIDE OF CABLE BARRIER MOW STRIP FOR A TOTAL WIDTH OF 6 FEET.
10. NO WORK THAT COULD HAVE AN IMPACT TO THE EXISTING FEMA 100YR WSEL IS BEING PROPOSED FOR THIS PROJECT.
11. FPA NOTIFICATION FOR ATASCOSA COUNTY WAS SUBMITTED IN WRITING ON MARCH, 19, 2024.

LEGEND

- OH E — EXIST OVERHEAD ELECTRIC LINE
- OH C — EXIST OVERHEAD COMMUNICATION LINE
- EXIST DRAINAGE STRUCTURE
- APPARENT R.O.W.
- PROPOSED CABLE BARRIER FENCE WITH 3' MOW STRIP
- TL-4 CABLE BARRIER TERMINAL
- TEMP SEDMT CONT FENCE
- TRAFFIC FLOW ARROWS

DESIGN

STATE OF TEXAS — JUSTIN W. CLARK — 118715 — LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 3/19/2024 DATE

APPROVAL

STATE OF TEXAS — GILMER D. GASTON — 80472 — LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 3/19/2024 DATE

0 50 100 150

SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

US 281: CABLE BARRIER

PROPOSED CABLE BARRIER LAYOUT

STA 1440+00 TO STA 1460+00

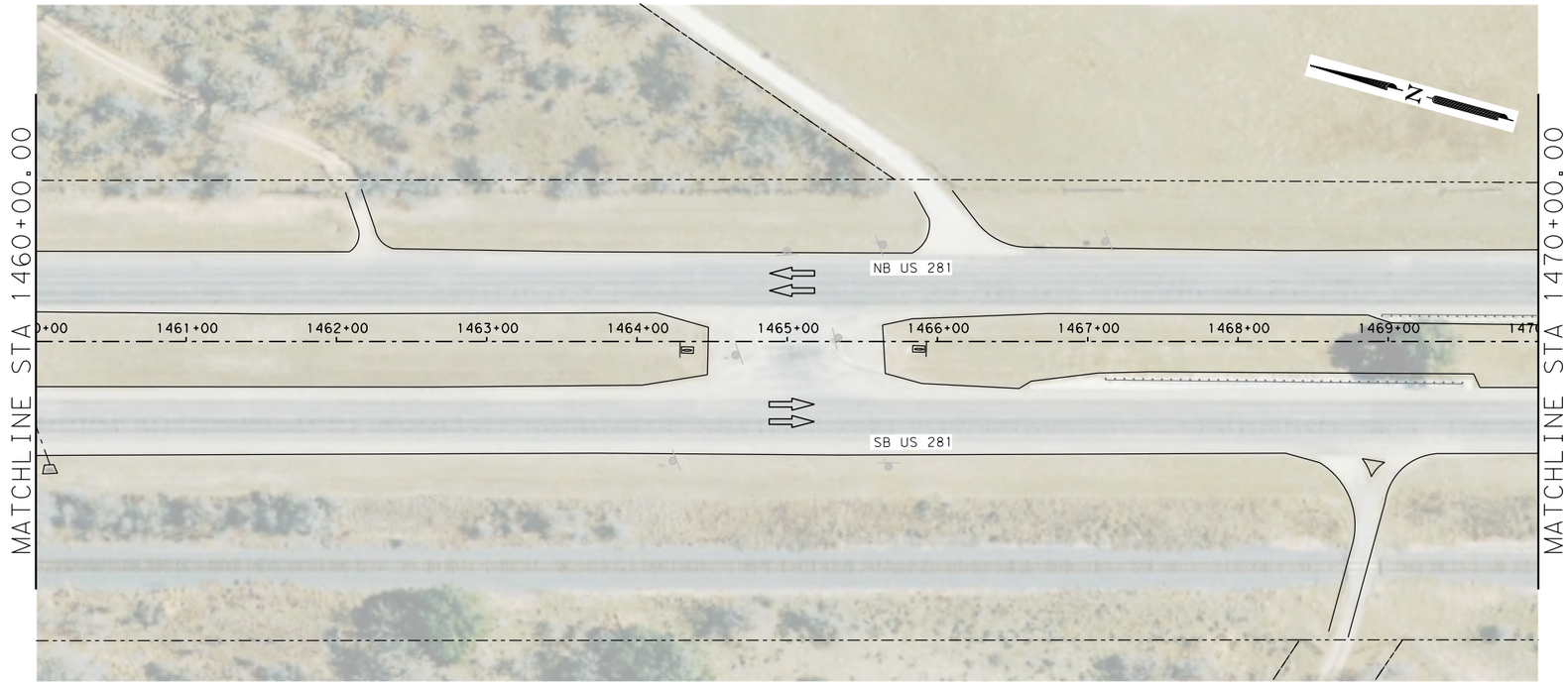
SHEET 23 OF 34

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	56

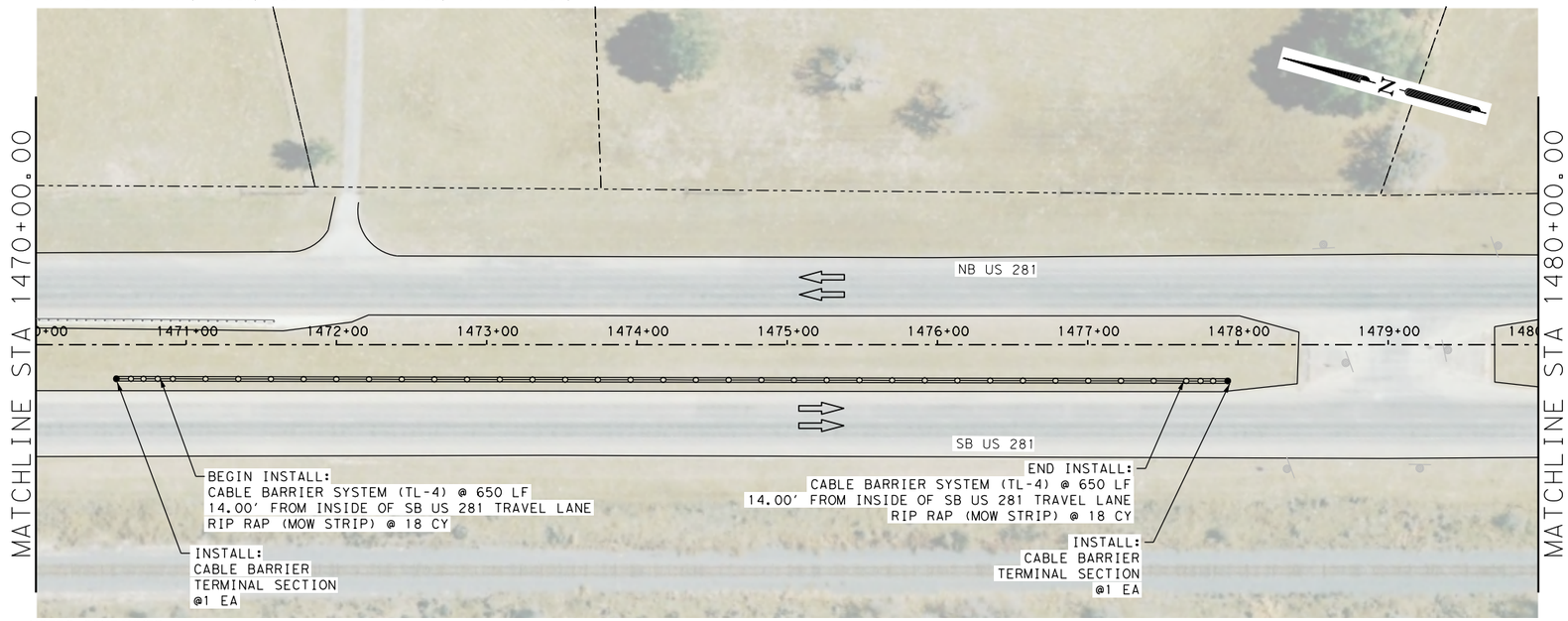
Plotted on: 3/19/2024

Design Filename: P:\122.96\02\Tasks\13_US 281 Cable Barrier\Design\Civil\Roadway\1229502_13_RDWY23.dgn

ITEM	DESCRIPTION	UNIT	QTY
0132-6021	EMBANKMENT (VEHICLE)(ORD COMP)(TY C)	CY	5
0150-6002	BLADING	HR	4.0
0164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	433
0164-6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	433
0168-6001	VEGETATIVE WATERING	MG	6.75
0169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	433
0432-6066	RIPRAP (CL A) (MOW STRIP) (3 IN)	CY	18
0506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	20
0506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	20
0543-6002	CABLE BARRIER SYSTEM (TL-4)	LF	650
0543-6020	CABLE BARRIER TERMINAL SECTION (TL-4)	EA	2



NOTES:
1. ALL RIGHT-OF-WAY LINES ARE APPROXIMATE. VERIFY LOCATIONS AS NECESSARY.
2. CABLE BARRIERS ARE DESIGNED TO BE PLACED ON 6:1 (16.67%) OR FLATTER SIDE SLOPES. TOPOGRAPHICAL SURVEYING WAS NOT PERFORMED ON THIS PROJECT. BASELINE COINCIDENCES WITH THE FLOWLINE OF DITCH. CABLE BARRIER LOCATIONS MAY BE ADJUSTED AS NEEDED TO FIT FIELD CONDITIONS AS DIRECTED BY THE ENGINEER.
3. CABLE BARRIERS SHALL BE PLACED WITH AT LEAST 12 FEET OFFSET FROM EDGE OF THE TRAVEL LANE. CABLE BARRIERS SHALL BE PLACED AT LEAST 8 FEET FROM THE BOTTOM OF THE DITCHLINE. OFFSET OF AT LEAST 5 FEET FROM THE EDGE OF ILLUMINATION POLE IS RECCOMMENDED.
4. UTILITY LOCATIONS ARE APPROXIMATE. ALL UTILITIES ARE SHOWN BASED ON AVAILABLE AS-BUILT DRAWINGS AND 811 UTILITY LOCATE. CONTRACTOR MUST FIELD VERIFY THE EXACT LOCATION OF EXISTING ROW, POLES, ELECTRICAL SERVICES, GROUND BOXES, AND OTHER PERTINENT ITEMS BEFORE COMMENCING WORK.



NOTES CONTINUED:
5. THE CONTRACTOR MUST COORDINATE WITH THE UTILITY COMPANIES TO VERIFY THE LOCATION OF EXISTING OVERHEAD AND UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION TO AVOID CONFLICTS WITH, OR DAMAGE TO, THESE UTILITIES.
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10. NO WORK THAT COULD HAVE AN IMPACT TO THE EXISTING FEMA 100YR WSEL IS BEING PROPOSED FOR THIS PROJECT.
11. FPA NOTIFICATION FOR ATASCOSA COUNTY WAS SUBMITTED IN WRITING ON MARCH, 19, 2024.

LEGEND

- OH E — EXIST OVERHEAD ELECTRIC LINE
- OH C — EXIST OVERHEAD COMMUNICATION LINE
- EXIST DRAINAGE STRUCTURE
- APPARENT R.O.W.
- PROPOSED CABLE BARRIER FENCE WITH 3' MOW STRIP
- TL-4 CABLE BARRIER TERMINAL
- TEMP SEDMT CONT FENCE
- TRAFFIC FLOW ARROWS

DESIGN

STATE OF TEXAS — JUSTIN W. CLARK — 118715 — LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 3/19/2024 DATE

APPROVAL

STATE OF TEXAS — GILMER D. GASTON — 80472 — LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 3/19/2024 DATE

0 50 100 150

SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

US 281: CABLE BARRIER

PROPOSED CABLE BARRIER LAYOUT

STA 1460+00 TO STA 1480+00

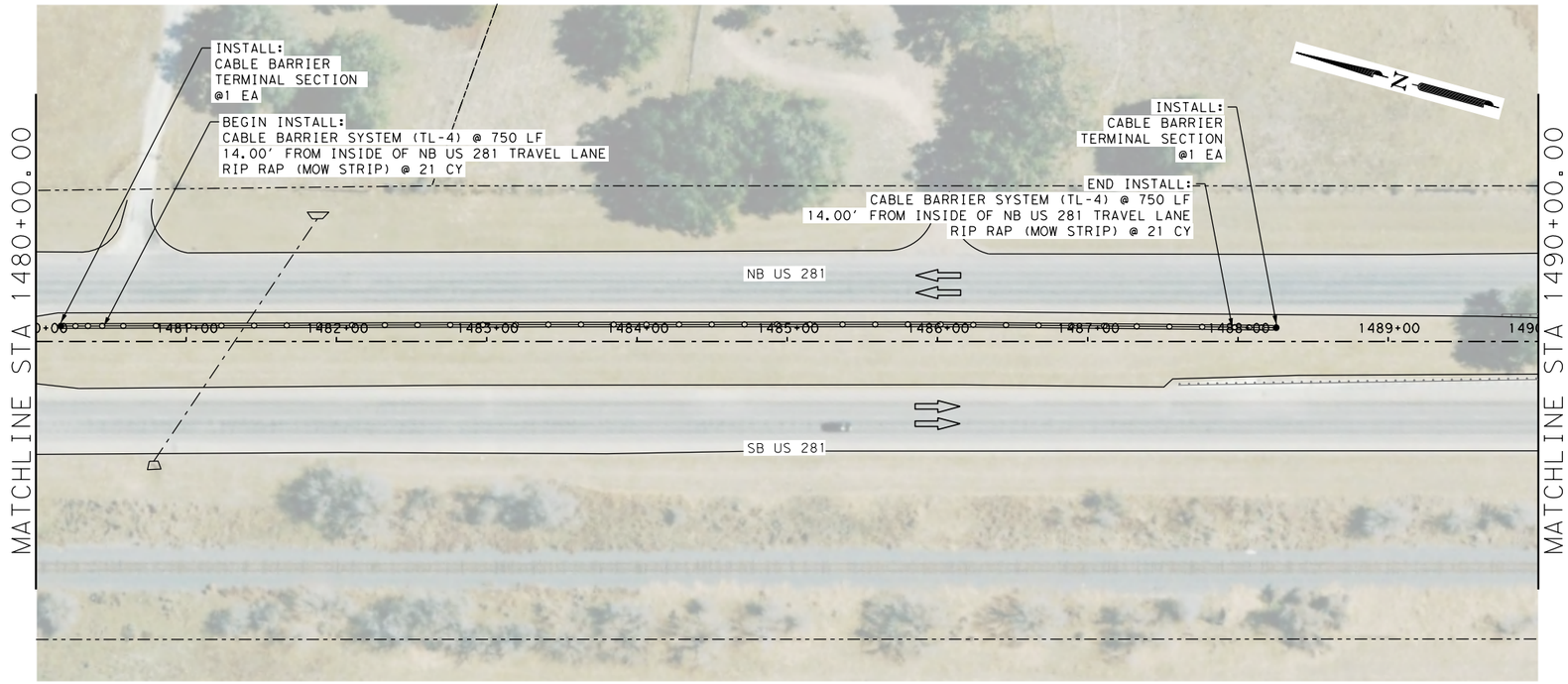
SHEET 24 OF 34

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	57

Plotted on: 3/19/2024

Design Filename: P:\122\96\02\Tasks\13_US 281 Cable Barrier\Design\Civil\Roadway\1229502_13_RDWY24.dgn

ITEM	DESCRIPTION	UNIT	QTY
0132-6021	EMBANKMENT (VEHICLE)(ORD COMP)(TY C)	CY	5
0150-6002	BLADING	HR	4.0
0164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	500
0164-6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	500
0168-6001	VEGETATIVE WATERING	MG	7.80
0169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	500
0432-6066	RIPRAP (CL A) (MOW STRIP) (3 IN)	CY	21
0543-6002	CABLE BARRIER SYSTEM (TL-4)	LF	750
0543-6020	CABLE BARRIER TERMINAL SECTION (TL-4)	EA	2



NOTES:
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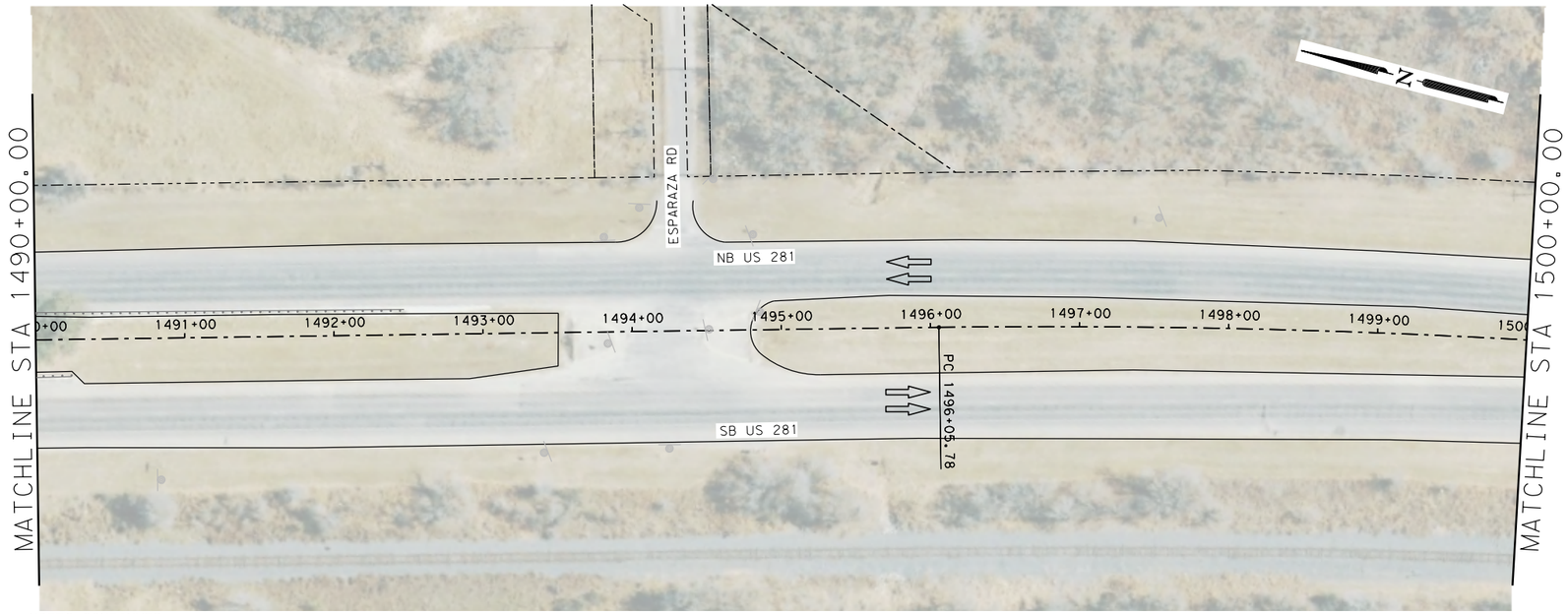

NOTES CONTINUED:
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11. FPA NOTIFICATION FOR ATASCOSA COUNTY WAS SUBMITTED IN WRITING ON MARCH, 19, 2024.

LEGEND

- OH E — EXIST OVERHEAD ELECTRIC LINE
- OH C — EXIST OVERHEAD COMMUNICATION LINE
- EXIST DRAINAGE STRUCTURE
- APPARENT R.O.W.
- PROPOSED CABLE BARRIER FENCE WITH 3' MOW STRIP
- TL-4 CABLE BARRIER TERMINAL
- TEMP SEDMT CONT FENCE
- TRAFFIC FLOW ARROWS

DESIGN

STATE OF TEXAS — JUSTIN W. CLARK — 118715 — LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 3/19/2024 DATE

APPROVAL

STATE OF TEXAS — GILMER D. GASTON — 80472 — LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 3/19/2024 DATE

0 50 100 150

SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

US 281: CABLE BARRIER

PROPOSED CABLE BARRIER LAYOUT

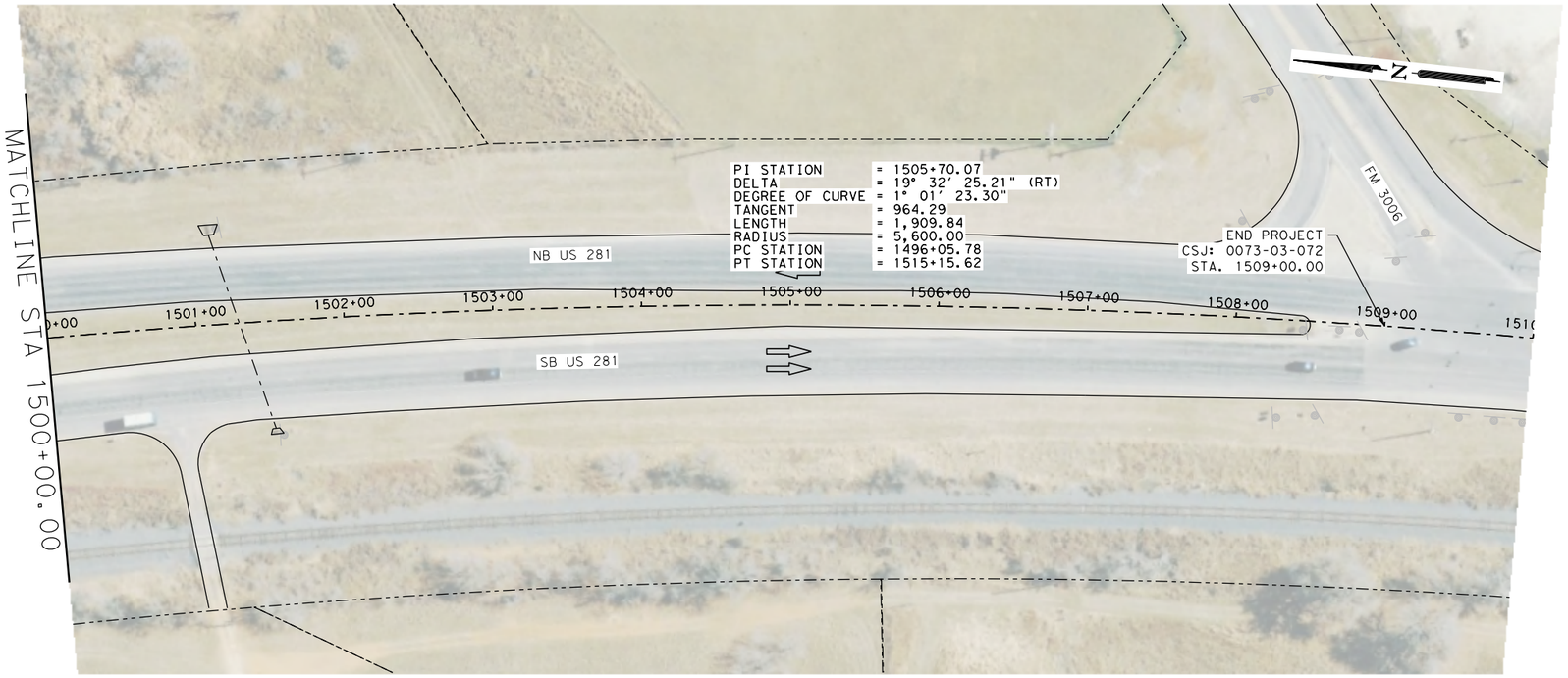
STA 1480+00 TO STA 1500+00

SHEET 25 OF 34

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	58

Plotted on: 3/19/2024

Design Filename: P:\122.96\02\Tasks\13_US 281 Cable Barrier\Design\Civil\Roadway\1229502_13_RDWY25.dgn



NOTES:
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2. CABLE BARRIERS ARE DESIGNED TO BE PLACED ON 6:1 (16.67%) OR FLATTER SIDE SLOPES. TOPOGRAPHICAL SURVEYING WAS NOT PERFORMED ON THIS PROJECT. BASELINE COINCIDENCES WITH THE FLOWLINE OF DITCH. CABLE BARRIER LOCATIONS MAY BE ADJUSTED AS NEEDED TO FIT FIELD CONDITIONS AS DIRECTED BY THE ENGINEER.
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NOTES CONTINUED:
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LEGEND

- OH E — EXIST OVERHEAD ELECTRIC LINE
- OH C — EXIST OVERHEAD COMMUNICATION LINE
- EXIST DRAINAGE STRUCTURE
- APPARENT R.O.W.
- PROPOSED CABLE BARRIER FENCE WITH 3' MOW STRIP
- TL-4 CABLE BARRIER TERMINAL
- TEMP SEDMT CONT FENCE
- TRAFFIC FLOW ARROWS

DESIGN

JUSTIN W. CLARK
118715
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

JUSTIN W. CLARK, P.E. — 3/19/2024 DATE

APPROVAL

GILMER D. GASTON
80472
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

GILMER D. GASTON, P.E. — 3/19/2024 DATE

0 50 100 150
SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

US 281: CABLE BARRIER

PROPOSED CABLE BARRIER LAYOUT

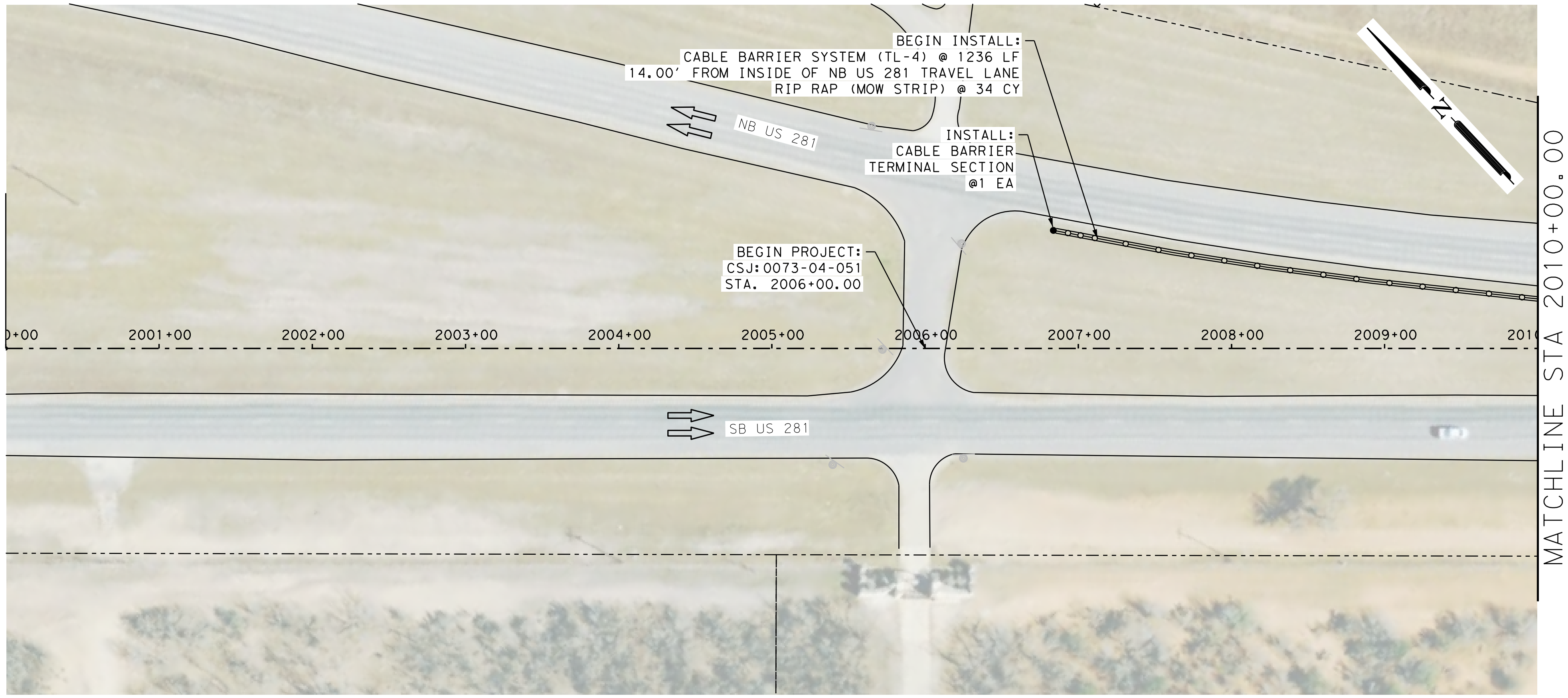
STA 1500+00 TO END PROJECT

SHEET 26 OF 34

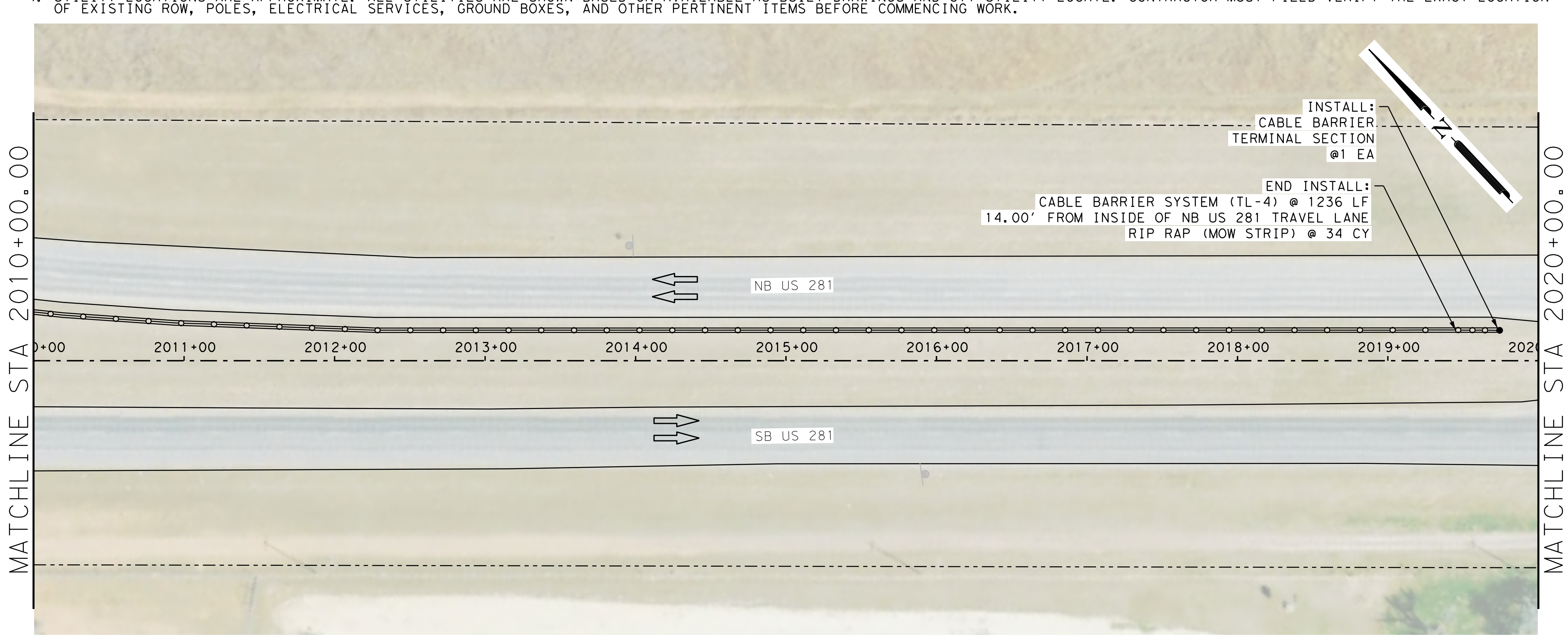
DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	59

Plotted on: 3/19/2024
Design Filename: P:\122\96\02\Tasks\13_US 281 Cable Barrier\Design\Civil\Roadway\1229502_13_RDWY26.dgn

ITEM	DESCRIPTION	UNIT	QTY
0132-6021	EMBANKMENT (VEHICLE)(ORD COMP)(TY C)	CY	9
0150-6002	BLADING	HR	7.0
0164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	824
0164-6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	824
0168-6001	VEGETATIVE WATERING	MG	12.85
0169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	824
0432-6066	RIPRAP (CL A) (MOW STRIP) (3 IN)	CY	34
0543-6002	CABLE BARRIER SYSTEM (TL-4)	LF	1236
0543-6020	CABLE BARRIER TERMINAL SECTION (TL-4)	EA	2



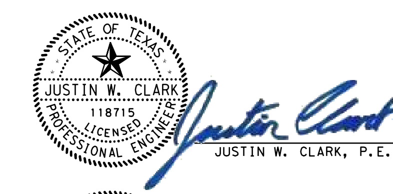
NOTES:
1. ALL RIGHT-OF-WAY LINES ARE APPROXIMATE. VERIFY LOCATIONS AS NECESSARY
2. CABLE BARRIERS ARE DESIGNED TO BE PLACED ON 6:1 (16.67%) OR FLATTER SIDE SLOPES. TOPOGRAPHICAL SURVEYING WAS NOT PERFORMED ON THIS PROJECT. BASELINE COINCIDENCES WITH THE FLOWLINE OF DITCH. CABLE BARRIER LOCATIONS MAY BE ADJUSTED AS NEEDED TO FIT FIELD CONDITIONS AS DIRECTED BY THE ENGINEER.
3. CABLE BARRIERS SHALL BE PLACED WITH AT LEAST 12 FEET OFFSET FROM EDGE OF THE TRAVEL LANE. CABLE BARRIERS SHALL BE PLACED AT LEAST 8 FEET FROM THE BOTTOM OF THE DITCHLINE. OFFSET OF AT LEAST 5 FEET FROM THE EDGE OF ILLUMINATION POLE IS RECCOMMENDED.
4. UTILITY LOCATIONS ARE APPROXIMATE. ALL UTILITIES ARE SHOWN BASED ON AVAILABLE AS-BUILT DRAWINGS AND 811 UTILITY LOCATE. CONTRACTOR MUST FIELD VERIFY THE EXACT LOCATION OF EXISTING ROW, POLES, ELECTRICAL SERVICES, GROUND BOXES, AND OTHER PERTINENT ITEMS BEFORE COMMENCING WORK.



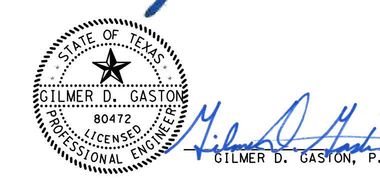
NOTES CONTINUED:
5. THE CONTRACTOR MUST COORDINATE WITH THE UTILITY COMPANIES TO VERIFY THE LOCATION OF EXISTING OVERHEAD AND UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION TO AVOID CONFLICTS WITH, OR DAMAGE TO, THESE UTILITIES.
6. STATIONING IS NOT TRUE IDENTIFICATION OF THE ROADWAY ALIGNMENT. NO TOPOGRAPHIC FILE WAS USED AS A BASIS FOR STATIONING.
7. CONTRACTOR SHALL INSTALL TEMPORARY SEDIMENT CONTROL FENCES AS NEEDED (NOT SHOWN ON PLANS)
8. MOW STRIP SHALL BE 36 INCHES WIDE UNLESS OTHERWISE SPECIFIED BE THE ENGINEER.
9. DRILL SEEDING AND SOIL RETENTION BLANKETS SHALL BE APPLIED AT A MINIMUM OF 3 FEET ON EITHER SIDE OF CABLE BARRIER MOW STRIP FOR A TOTAL WIDTH OF 6 FEET.
10. NO WORK THAT COULD HAVE AN IMPACT TO THE EXISTING FEMA 100YR WSEL IS BEING PROPOSED FOR THIS PROJECT.
11. FPA NOTIFICATION FOR ATASCOSA COUNTY WAS SUBMITTED IN WRITING ON MARCH,19,2024.

LEGEND

OH E — EXIST OVERHEAD ELECTRIC LINE
OH C — EXIST OVERHEAD COMMUNICATION LINE
EXIST DRAINAGE STRUCTURE
APPARENT R.O.W.
PROPOSED CABLE BARRIER FENCE WITH 3' MOW STRIP
TL-4 CABLE BARRIER TERMINAL
TEMP SEDMT CONT FENCE
TRAFFIC FLOW ARROWS



JUSTIN W. CLARK, P.E. 3/19/2024 DATE



GILMER D. GASTON, P.E. 3/19/2024 DATE

0 50 100 150
SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

Texas Department of Transportation

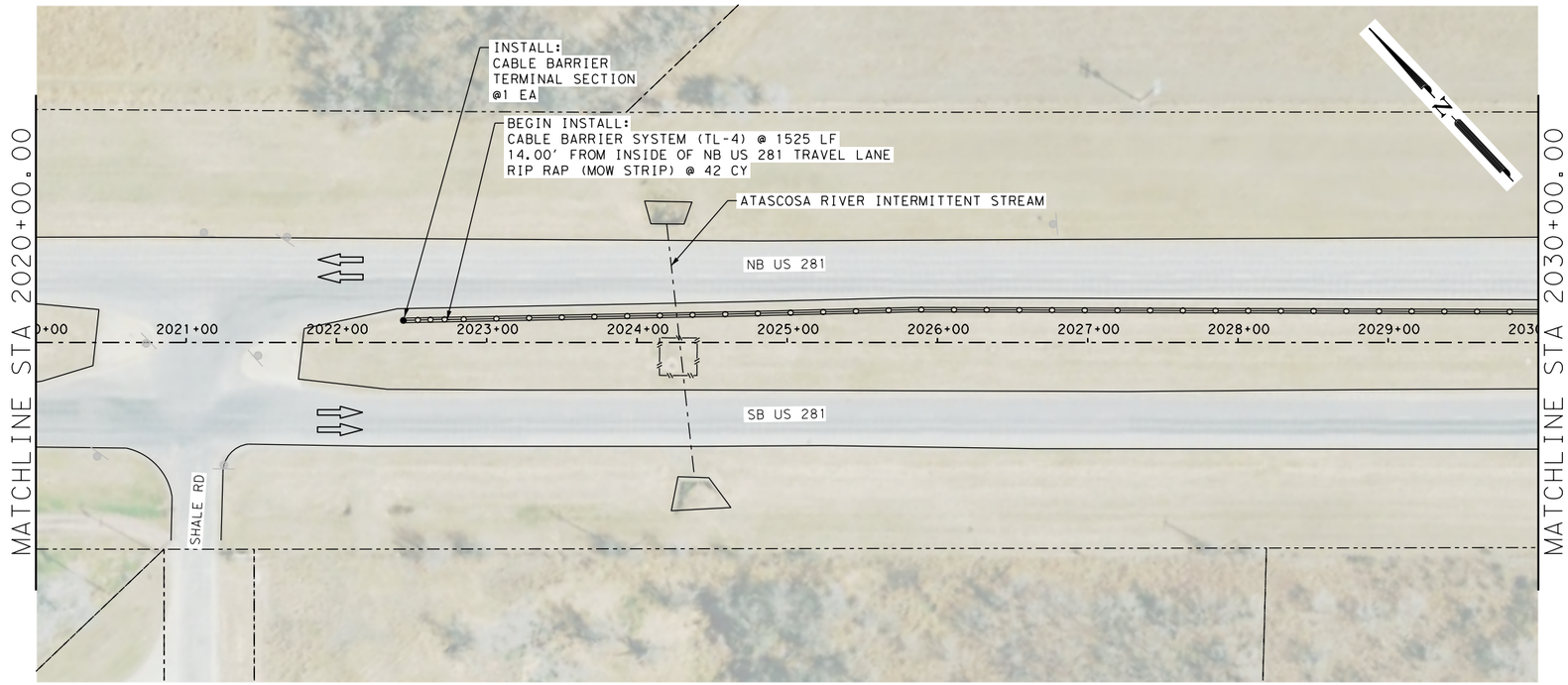
US 281: CABLE BARRIER

PROPOSED CABLE BARRIER LAYOUT

BEGIN PROJECT TO STA 2020+00

SHEET 27 OF 34

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	60



NOTES:
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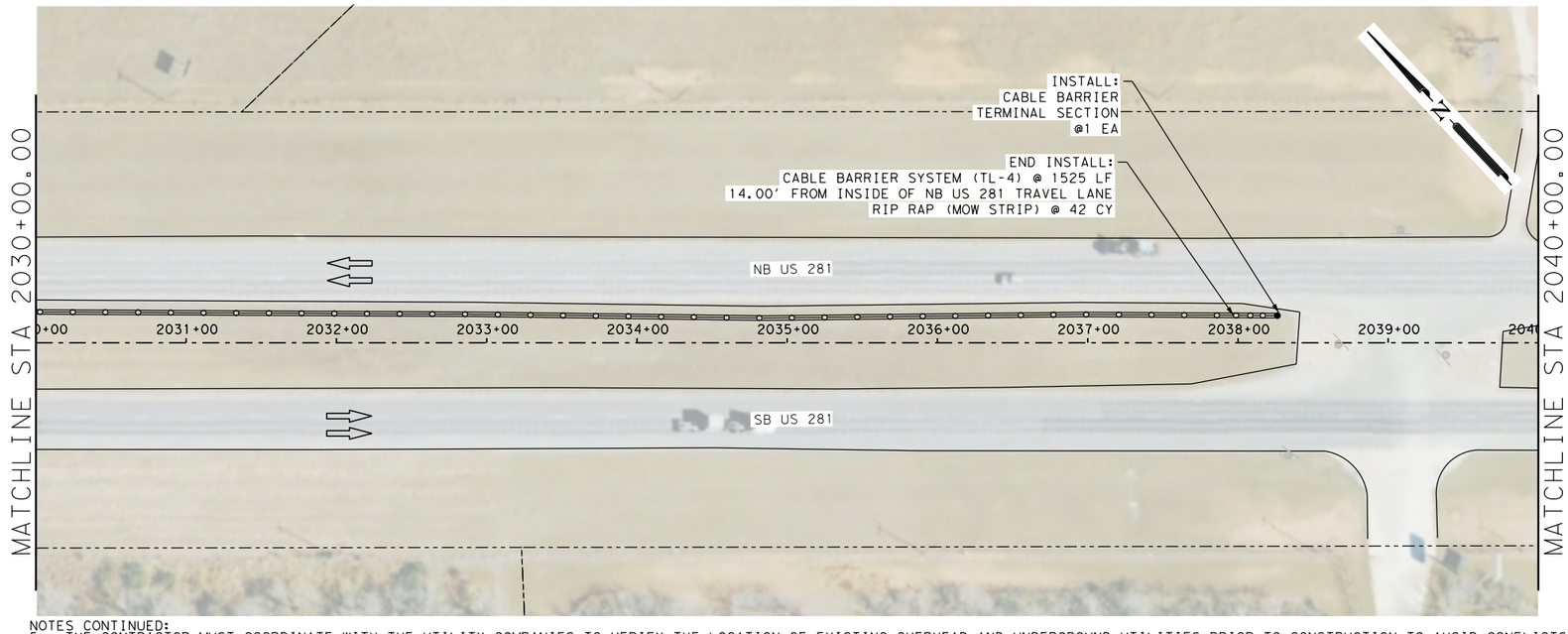
2. CABLE BARRIERS ARE DESIGNED TO BE PLACED ON 6:1 (16.67%) OR FLATTER SIDE SLOPES. TOPOGRAPHICAL SURVEYING WAS NOT PERFORMED ON THIS PROJECT. BASELINE COINCIDENCES WITH THE FLOWLINE OF DITCH. CABLE BARRIER LOCATIONS MAY BE ADJUSTED AS NEEDED TO FIT FIELD CONDITIONS AS DIRECTED BY THE ENGINEER.
3. CABLE BARRIERS SHALL BE PLACED WITH AT LEAST 12 FEET OFFSET FROM EDGE OF THE TRAVEL LANE. CABLE BARRIERS SHALL BE PLACED AT LEAST 8 FEET FROM THE BOTTOM OF THE DITCHLINE. OFFSET OF AT LEAST 5 FEET FROM THE EDGE OF ILLUMINATION POLE IS RECCOMMENDED.
4. UTILITY LOCATIONS ARE APPROXIMATE. ALL UTILITIES ARE SHOWN BASED ON AVAILABLE AS-BUILT DRAWINGS AND 811 UTILITY LOCATE. CONTRACTOR MUST FIELD VERIFY THE EXACT LOCATION OF EXISTING ROW, POLES, ELECTRICAL SERVICES, GROUND BOXES, AND OTHER PERTINENT ITEMS BEFORE COMMENCING WORK.



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7. CONTRACTOR SHALL INSTALL TEMPORARY SEDIMENT CONTROL FENCES AS NEEDED (NOT SHOWN ON PLANS)
8. MOW STRIP SHALL BE 36 INCHES WIDE UNLESS OTHERWISE SPECIFIED BE THE ENGINEER.
9. DRILL SEEDING AND SOIL RETENTION BLANKETS SHALL BE APPLIED AT A MINIMUM OF 3 FEET ON EITHER SIDE OF CABLE BARRIER MOW STRIP FOR A TOTAL WIDTH OF 6 FEET.
10. NO WORK THAT COULD HAVE AN IMPACT TO THE EXISTING FEMA 100YR WSEL IS BEING PROPOSED FOR THIS PROJECT.
11. FPA NOTIFICATION FOR ATASCOSA COUNTY WAS SUBMITTED IN WRITING ON MARCH, 19, 2024.

ITEM	DESCRIPTION	UNIT	QTY
0132-6021	EMBANKMENT (VEHICLE)(ORD COMP)(TY C)	CY	11
0150-6002	BLADING	HR	9.0
0164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	1017
0164-6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	1017
0168-6001	VEGETATIVE WATERING	MG	15.87
0169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	1017
0432-6066	RIPRAP (CL A) (MOW STRIP) (3 IN)	CY	42
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	100
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	100
0543-6002	CABLE BARRIER SYSTEM (TL-4)	LF	1525
0543-6020	CABLE BARRIER TERMINAL SECTION (TL-4)	EA	2
			.

LEGEND

- OH E — EXIST OVERHEAD ELECTRIC LINE
- OH C — EXIST OVERHEAD COMMUNICATION LINE
- EXIST DRAINAGE STRUCTURE
- APPARENT R.O.W.
- PROPOSED CABLE BARRIER FENCE WITH 3' MOW STRIP
- TL-4 CABLE BARRIER TERMINAL
- TEMP SEDMT CONT FENCE
- TRAFFIC FLOW ARROWS

STATE OF TEXAS — JUSTIN W. CLARK — 118715 — LICENSED PROFESSIONAL ENGINEER
JUSTIN W. CLARK, P.E. — 3/19/2024 DATE

STATE OF TEXAS — GILMER D. GASTON — 80472 — LICENSED PROFESSIONAL ENGINEER
GILMER D. GASTON, P.E. — 3/19/2024 DATE

0 50 100 150
SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

US 281: CABLE BARRIER

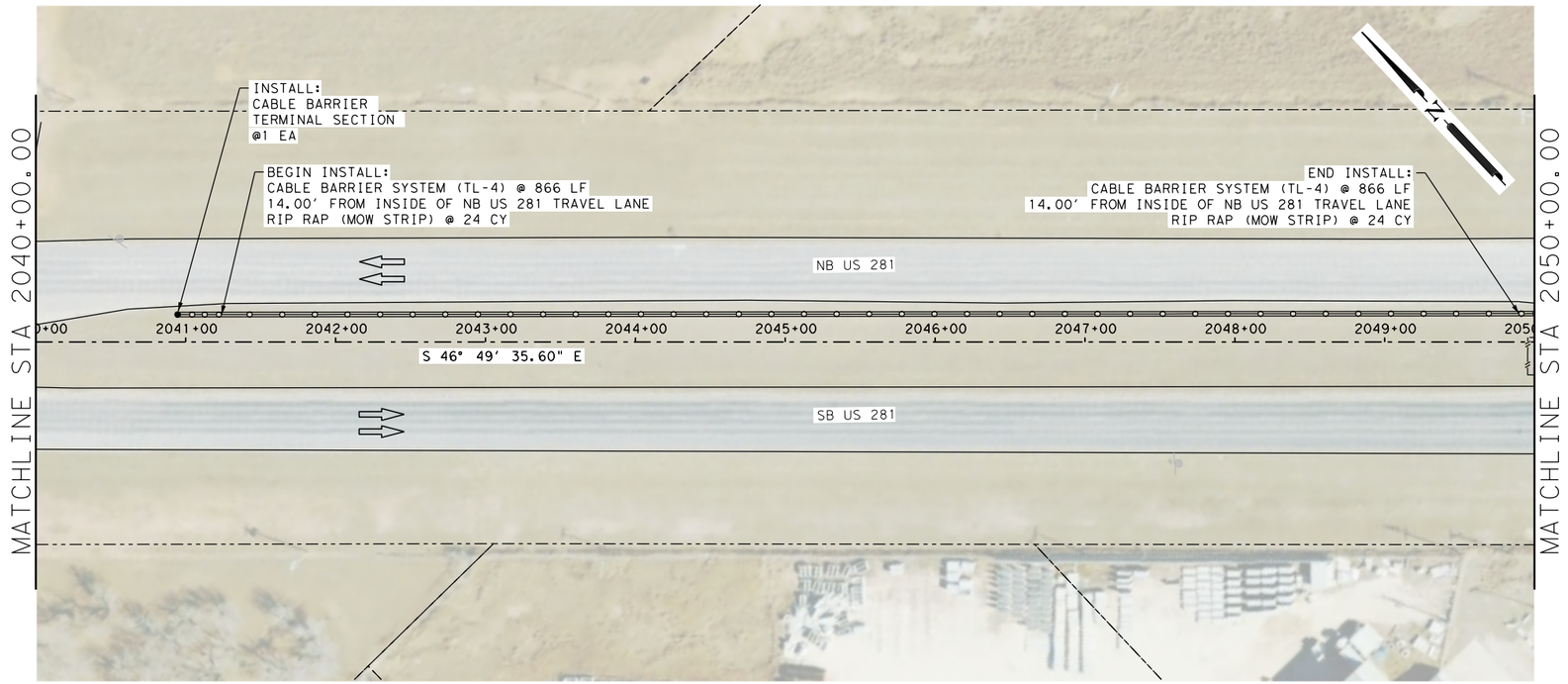
PROPOSED CABLE BARRIER LAYOUT

STA 2020+00 TO STA 2040+00

SHEET 28 OF 34

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	61

ITEM	DESCRIPTION	UNIT	QTY
0132-6021	EMBANKMENT (VEHICLE)(ORD COMP)(TY C)	CY	11
0150-6002	BLADING	HR	9.0
0164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	1034
0164-6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	1034
0168-6001	VEGETATIVE WATERING	MG	16.13
0169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	1034
0432-6066	RIPRAP (CL A) (MOW STRIP) (3 IN)	CY	43
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	125
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	125
0543-6002	CABLE BARRIER SYSTEM (TL-4)	LF	1551
0543-6020	CABLE BARRIER TERMINAL SECTION (TL-4)	EA	3



NOTES:
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2. CABLE BARRIERS ARE DESIGNED TO BE PLACED ON 6:1 (16.67%) OR FLATTER SIDE SLOPES. TOPOGRAPHICAL SURVEYING WAS NOT PERFORMED ON THIS PROJECT. BASELINE COINCIDENCES WITH THE FLOWLINE OF DITCH. CABLE BARRIER LOCATIONS MAY BE ADJUSTED AS NEEDED TO FIT FIELD CONDITIONS AS DIRECTED BY THE ENGINEER.
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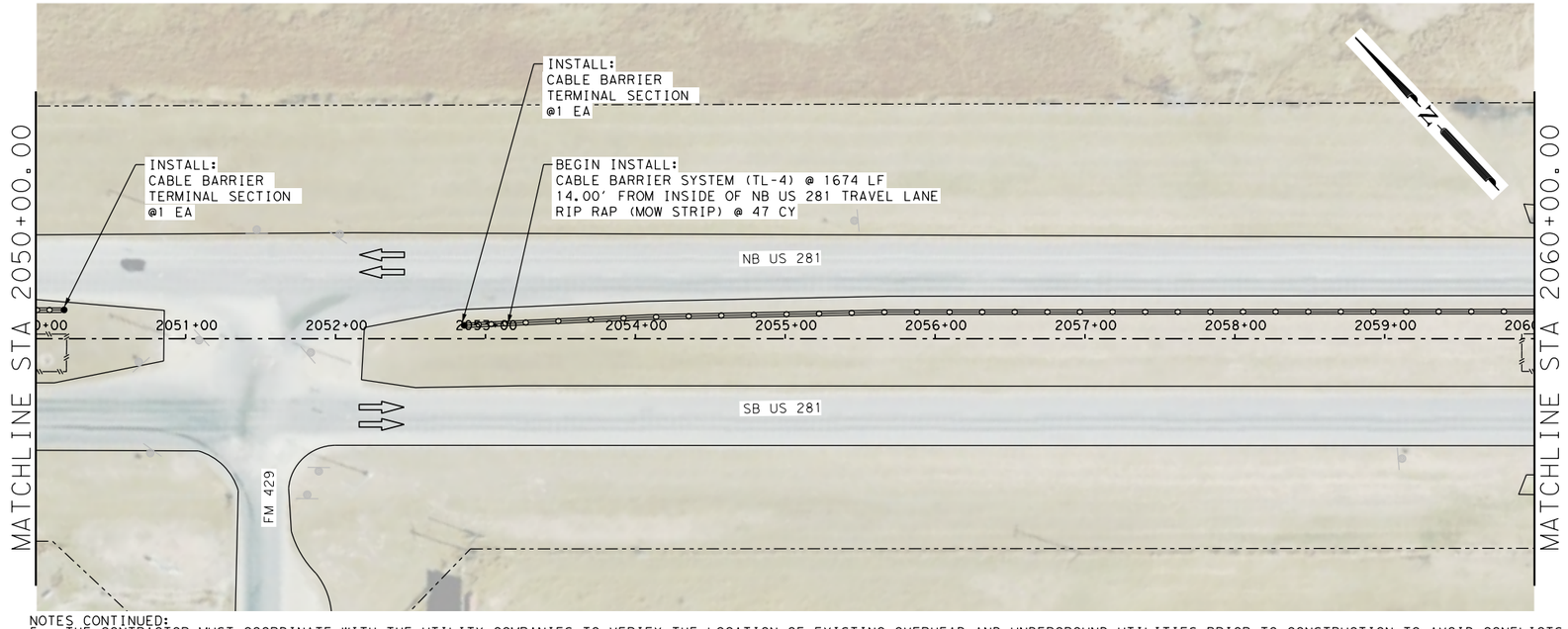

NOTES CONTINUED:
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11. FPA NOTIFICATION FOR ATASCOSA COUNTY WAS SUBMITTED IN WRITING ON MARCH, 19, 2024.

LEGEND

- OH E — EXIST OVERHEAD ELECTRIC LINE
- OH C — EXIST OVERHEAD COMMUNICATION LINE
- EXIST DRAINAGE STRUCTURE
- APPARENT R.O.W.
- PROPOSED CABLE BARRIER FENCE WITH 3' MOW STRIP
- TL-4 CABLE BARRIER TERMINAL
- TEMP SEDMT CONT FENCE
- TRAFFIC FLOW ARROWS

STATE OF TEXAS — JUSTIN W. CLARK — 118715 — LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 3/19/2024 DATE

STATE OF TEXAS — GILMER D. GASTON — 80472 — LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 3/19/2024 DATE

0 50 100 150

SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

US 281: CABLE BARRIER

PROPOSED CABLE BARRIER LAYOUT

STA 2040+00 TO STA 2060+00

SHEET 29 OF 34

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	62

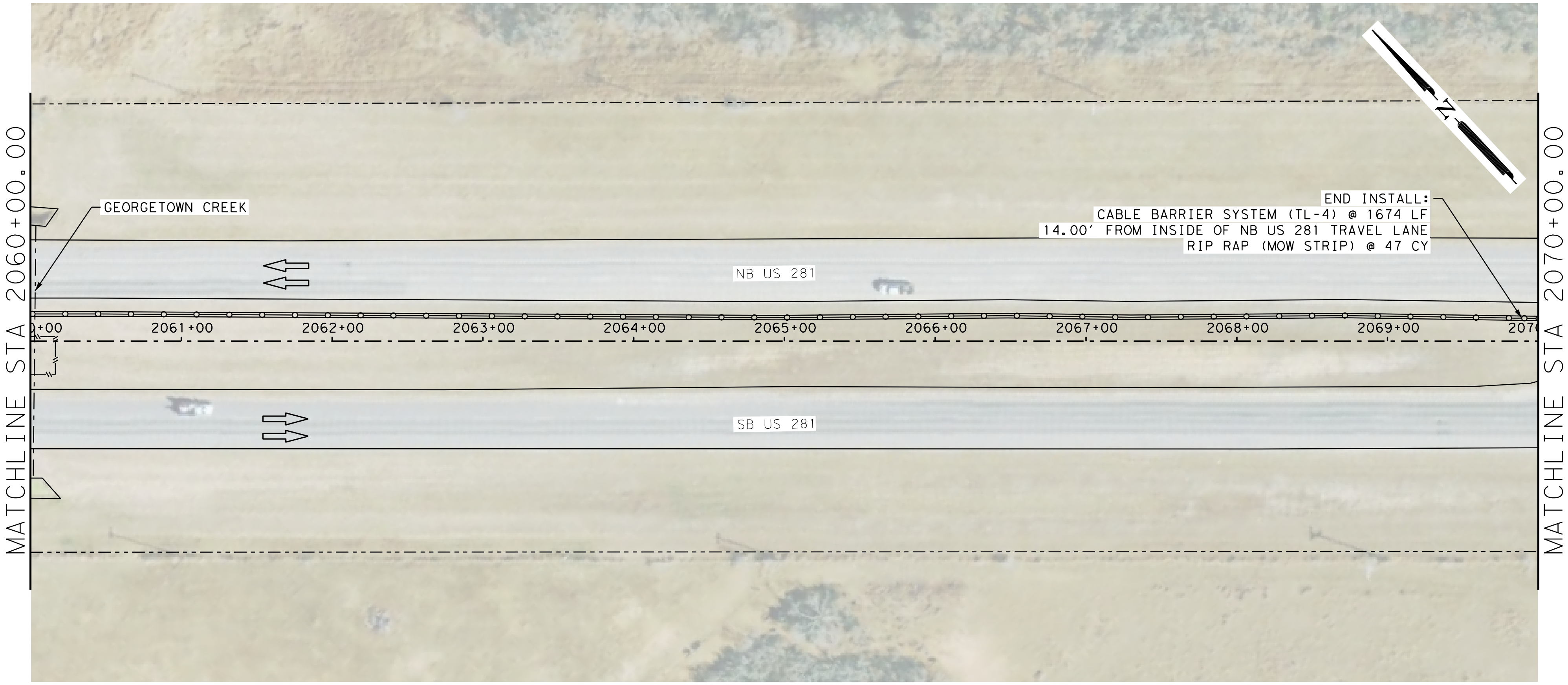
Plotted on: 3/19/2024

Design Filename: P:\122\96\02\Tasks\13_US 281 Cable Barrier\Design\Civil\Roadway\1229502_13_RDWY29.dgn

Plotted on: 3/19/2024

Design Filename: P:\122\96\02\Tasks\13_US 281 Cable Barrier\Design\Civil\Roadway\1229502_13_RDWY30.dgn

ITEM	DESCRIPTION	UNIT	QTY
0132-6021	EMBANKMENT (VEHICLE)(ORD COMP)(TY C)	CY	12
0150-6002	BLADING	HR	10.0
0164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	1141
0164-6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	1141
0168-6001	VEGETATIVE WATERING	MG	17.80
0169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	1141
0432-6066	RIPRAP (CL A) (MOW STRIP) (3 IN)	CY	48
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	175
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	175
0543-6002	CABLE BARRIER SYSTEM (TL-4)	LF	1711
0543-6020	CABLE BARRIER TERMINAL SECTION (TL-4)	EA	2



LEGEND

OH E	EXIST OVERHEAD ELECTRIC LINE
OH C	EXIST OVERHEAD COMMUNICATION LINE
	EXIST DRAINAGE STRUCTURE
	APPARENT R.O.W.
	PROPOSED CABLE BARRIER FENCE WITH 3' MOW STRIP
	TL-4 CABLE BARRIER TERMINAL
	TEMP SEDMT CONT FENCE
	TRAFFIC FLOW ARROWS

NOTES:
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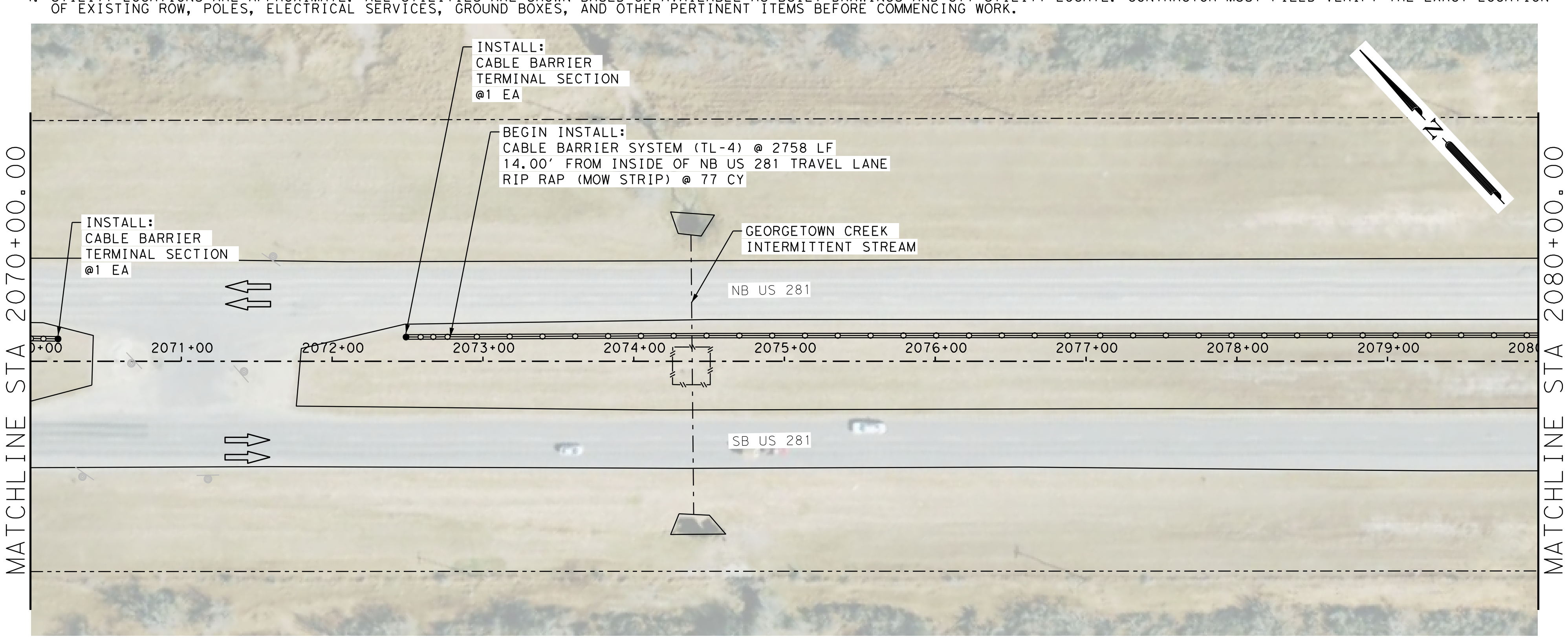

NOTES CONTINUED:
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STATE OF TEXAS — JUSTIN W. CLARK — 118715 — LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 3/19/2024 DATE

STATE OF TEXAS — GILMER D. GASTON — 80472 — LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 3/19/2024 DATE

0 50 100 150

SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS

2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000

TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028800

Texas Department of Transportation

US 281: CABLE BARRIER

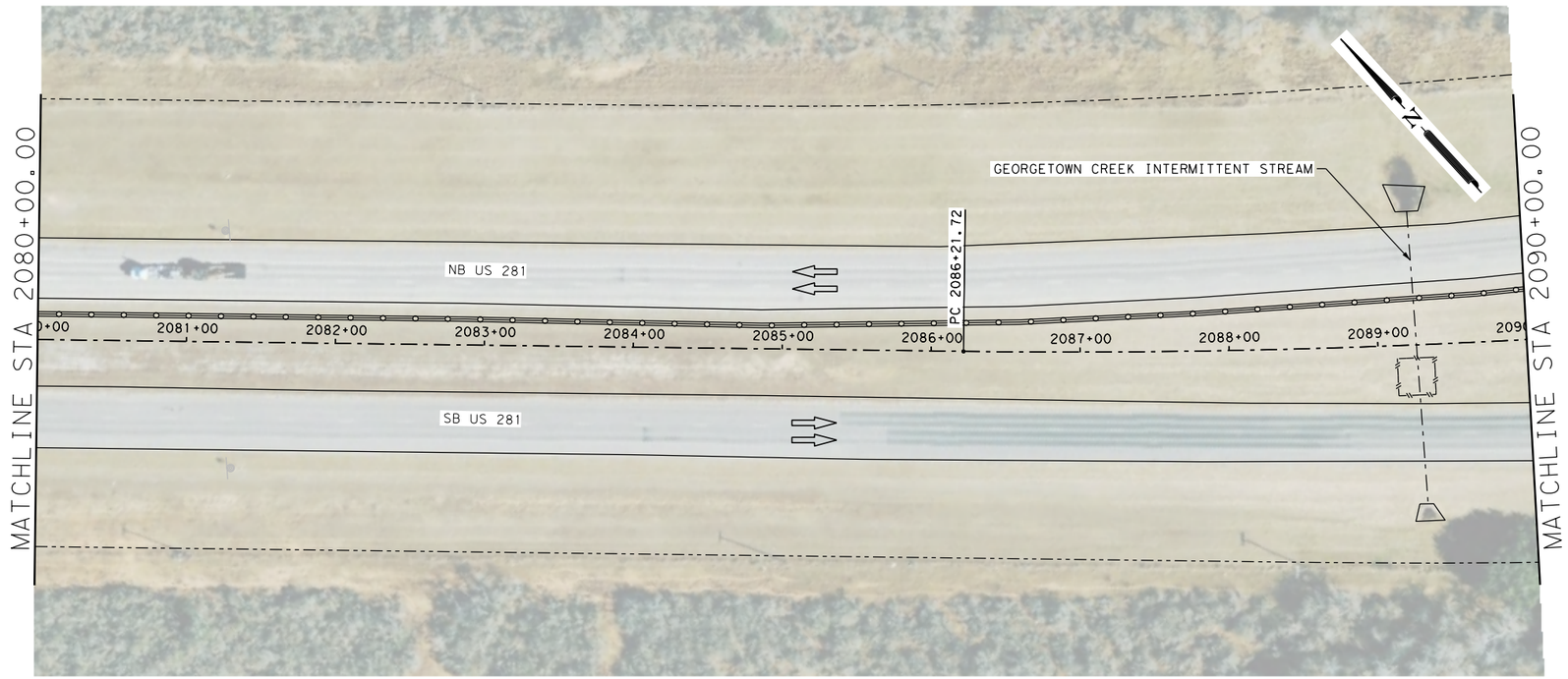
PROPOSED CABLE BARRIER LAYOUT

STA 2060+00 TO STA 2080+00

SHEET 30 OF 34

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	63

ITEM	DESCRIPTION	UNIT	QTY
0132-6021	EMBANKMENT (VEHICLE)(ORD COMP)(TY C)	CY	14
0150-6002	BLADING	HR	10.0
0164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	1331
0164-6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	1331
0168-6001	VEGETATIVE WATERING	MG	20.76
0169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	1331
0432-6066	RIPRAP (CL A) (MOW STRIP) (3 IN)	CY	55
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	200
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	200
0543-6002	CABLE BARRIER SYSTEM (TL-4)	LF	1996



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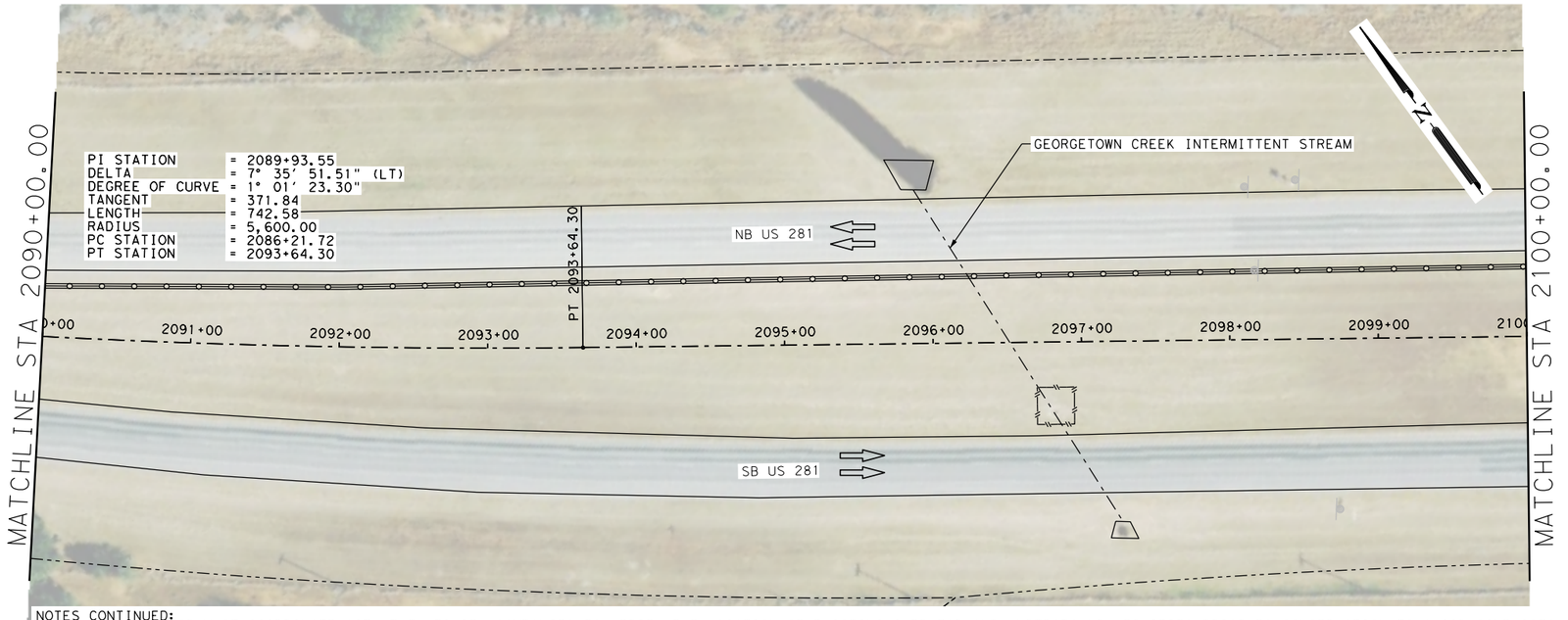

NOTES CONTINUED:
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LEGEND

- OH E — EXIST OVERHEAD ELECTRIC LINE
- OH C — EXIST OVERHEAD COMMUNICATION LINE
- EXIST DRAINAGE STRUCTURE
- APPARENT R.O.W.
- PROPOSED CABLE BARRIER FENCE WITH 3' MOW STRIP
- TL-4 CABLE BARRIER TERMINAL
- TEMP SEDMT CONT FENCE
- TRAFFIC FLOW ARROWS

STATE OF TEXAS — JUSTIN W. CLARK — 118715 — LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 3/19/2024 DATE

STATE OF TEXAS — GILMER D. GASTON — 80472 — LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 3/19/2024 DATE

0 50 100 150

SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

US 281: CABLE BARRIER

PROPOSED CABLE BARRIER LAYOUT

STA 2080+00 TO STA 2100+00

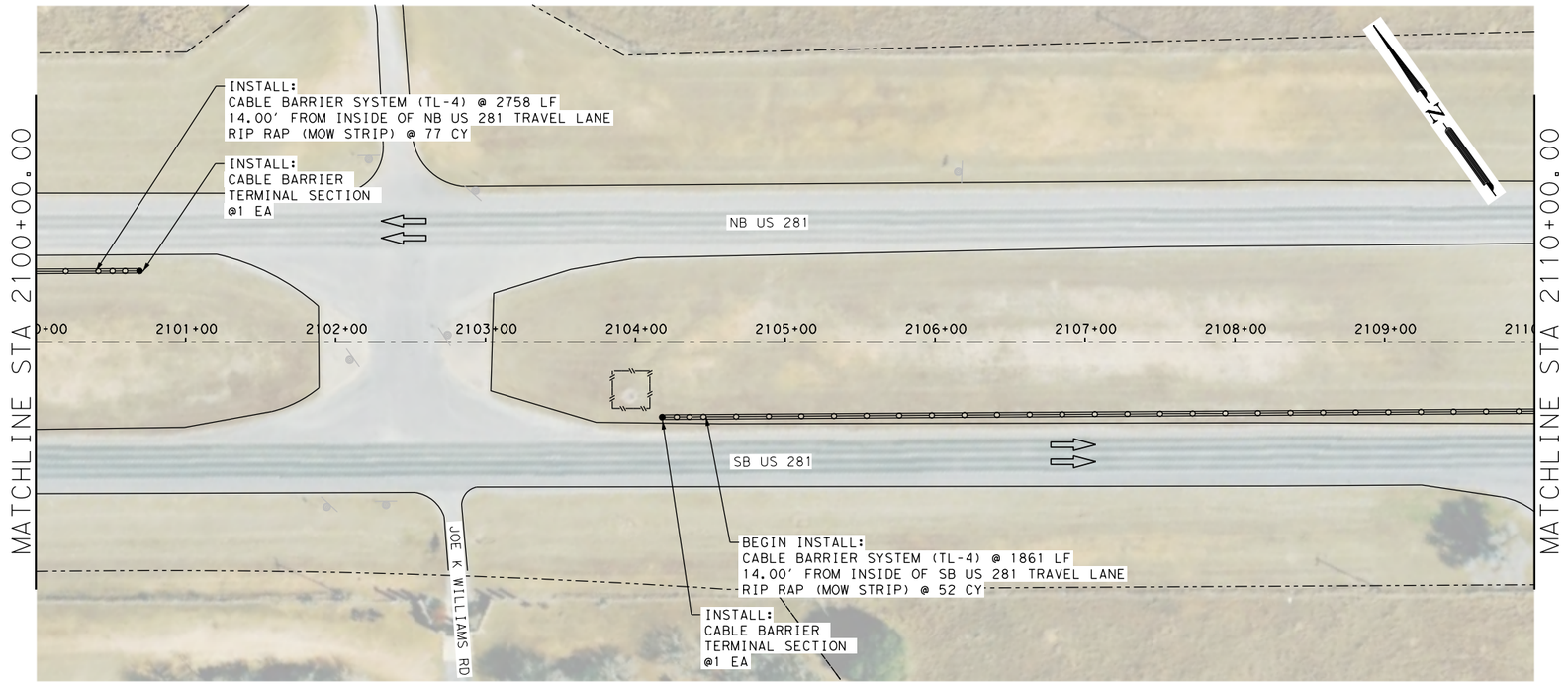
SHEET 31 OF 34

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	64

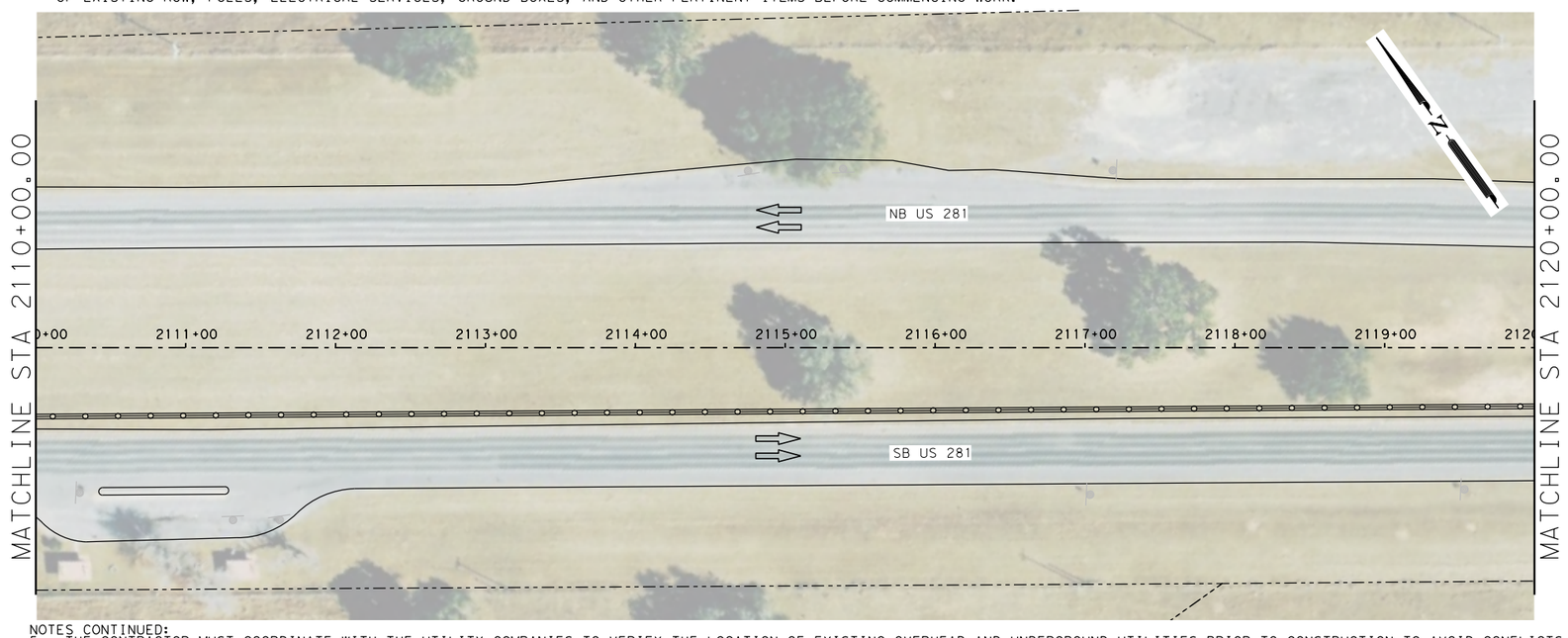
Plotted on: 3/19/2024

Design Filename: P:\122\96\02\Tasks\13_US 281 Cable Barrier\Design\Civil\Roadway\1229502_13_RDWY31.dgn

ITEM	DESCRIPTION	UNIT	QTY
0132-6021	EMBANKMENT (VEHICLE)(ORD COMP)(TY C)	CY	11
0150-6002	BLADING	HR	9.0
0164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	1062
0164-6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	1062
0168-6001	VEGETATIVE WATERING	MG	16.57
0169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	1062
0432-6066	RIPRAP (CL A) (MOW STRIP) (3 IN)	CY	44
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	100
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	100
0543-6002	CABLE BARRIER SYSTEM (TL-4)	LF	1593
0543-6020	CABLE BARRIER TERMINAL SECTION (TL-4)	EA	2



NOTES:
1. ALL RIGHT-OF-WAY LINES ARE APPROXIMATE. VERIFY LOCATIONS AS NECESSARY
2. CABLE BARRIERS ARE DESIGNED TO BE PLACED ON 6:1 (16.67%) OR FLATTER SIDE SLOPES. TOPOGRAPHICAL SURVEYING WAS NOT PERFORMED ON THIS PROJECT. BASELINE COINCIDENCES WITH THE FLOWLINE OF DITCH. CABLE BARRIER LOCATIONS MAY BE ADJUSTED AS NEEDED TO FIT FIELD CONDITIONS AS DIRECTED BY THE ENGINEER.
3. CABLE BARRIERS SHALL BE PLACED WITH AT LEAST 12 FEET OFFSET FROM EDGE OF THE TRAVEL LANE. CABLE BARRIERS SHALL BE PLACED AT LEAST 8 FEET FROM THE BOTTOM OF THE DITCHLINE. OFFSET OF AT LEAST 5 FEET FROM THE EDGE OF ILLUMINATION POLE IS RECCOMMENDED.
4. UTILITY LOCATIONS ARE APPROXIMATE. ALL UTILITIES ARE SHOWN BASED ON AVAILABLE AS-BUILT DRAWINGS AND 811 UTILITY LOCATE. CONTRACTOR MUST FIELD VERIFY THE EXACT LOCATION OF EXISTING ROW, POLES, ELECTRICAL SERVICES, GROUND BOXES, AND OTHER PERTINENT ITEMS BEFORE COMMENCING WORK.



NOTES CONTINUED:
5. THE CONTRACTOR MUST COORDINATE WITH THE UTILITY COMPANIES TO VERIFY THE LOCATION OF EXISTING OVERHEAD AND UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION TO AVOID CONFLICTS WITH, OR DAMAGE TO, THESE UTILITIES.
6. STATIONING IS NOT TRUE IDENTIFICATION OF THE ROADWAY ALIGNMENT. NO TOPOGRAPHIC FILE WAS USED AS A BASIS FOR STATIONING.
7. CONTRACTOR SHALL INSTALL TEMPORARY SEDIMENT CONTROL FENCES AS NEEDED (NOT SHOWN ON PLANS)
8. MOW STRIP SHALL BE 36 INCHES WIDE UNLESS OTHERWISE SPECIFIED BE THE ENGINEER.
9. DRILL SEEDING AND SOIL RETENTION BLANKETS SHALL BE APPLIED AT A MINIMUM OF 3 FEET ON EITHER SIDE OF CABLE BARRIER MOW STRIP FOR A TOTAL WIDTH OF 6 FEET.
10. NO WORK THAT COULD HAVE AN IMPACT TO THE EXISTING FEMA 100YR WSEL IS BEING PROPOSED FOR THIS PROJECT.
11. FPA NOTIFICATION FOR ATASCOSA COUNTY WAS SUBMITTED IN WRITING ON MARCH, 19, 2024.

LEGEND

- OH E — EXIST OVERHEAD ELECTRIC LINE
- OH C — EXIST OVERHEAD COMMUNICATION LINE
- EXIST DRAINAGE STRUCTURE
- APPARENT R.O.W.
- PROPOSED CABLE BARRIER FENCE WITH 3' MOW STRIP
- TL-4 CABLE BARRIER TERMINAL
- TEMP SEDMT CONT FENCE
- TRAFFIC FLOW ARROWS

STATE OF TEXAS — JUSTIN W. CLARK — 118715 — LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 3/19/2024 DATE

STATE OF TEXAS — GILMER D. GASTON — 80472 — LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 3/19/2024 DATE

0 50 100 150

SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

US 281: CABLE BARRIER

PROPOSED CABLE BARRIER LAYOUT

STA 2100+00 TO STA 2120+00

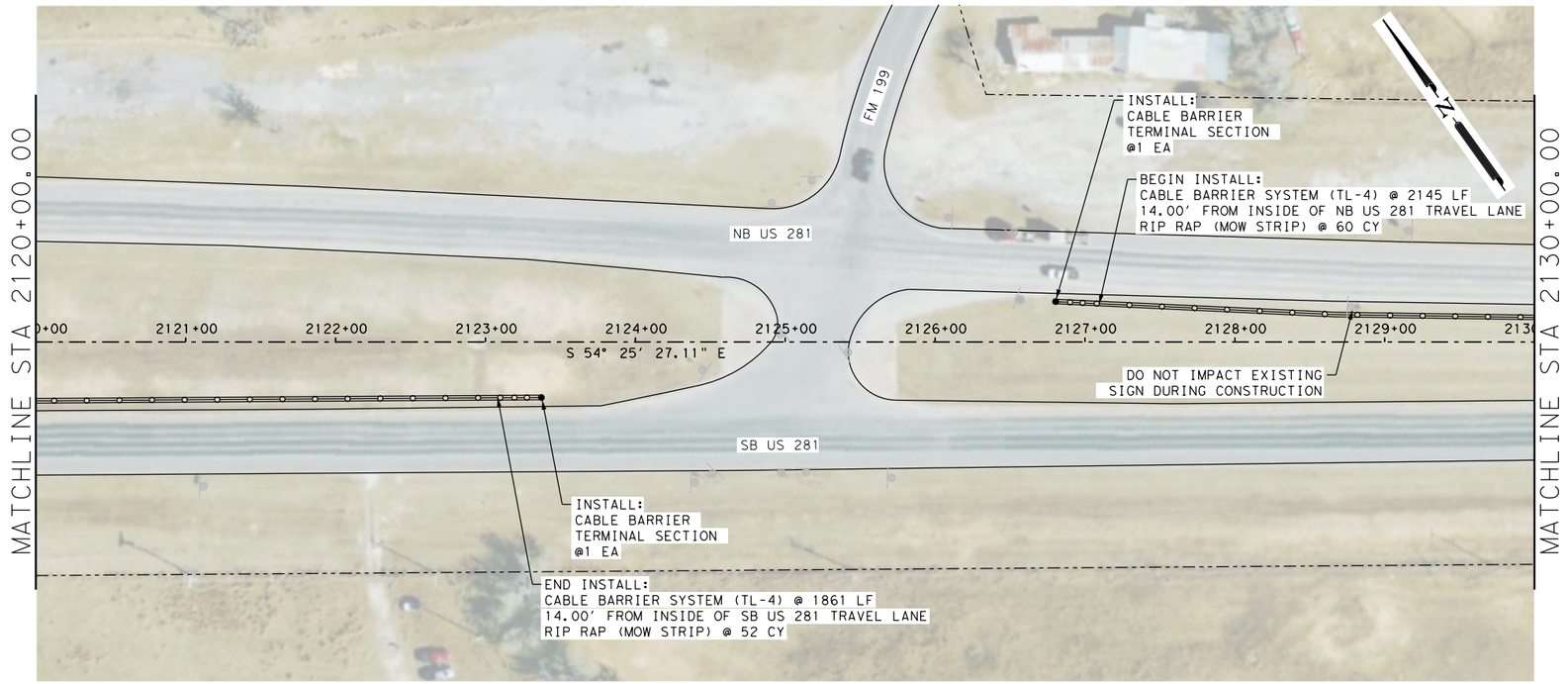
SHEET 32 OF 34

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	65

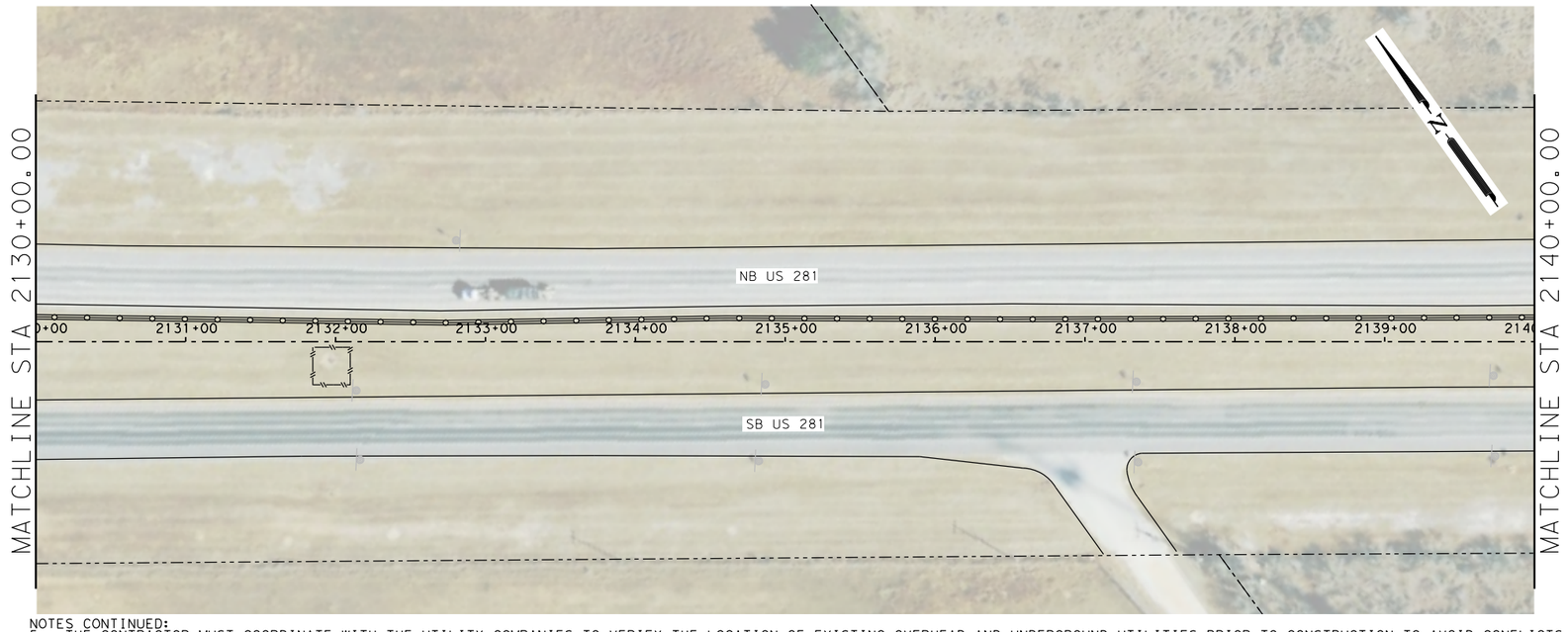
Plotted on: 3/19/2024

Design Filename: P:\122\96\02\Tasks\13_US 281 Cable Barrier\Design\Civil\Roadway\1229502_13_RDWY32.dgn

ITEM	DESCRIPTION	UNIT	QTY
0132-6021	EMBANKMENT (VEHICLE)(ORD COMP)(TY C)	CY	11
0150-6002	BLADING	HR	9.0
0164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	1066
0164-6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	1066
0168-6001	VEGETATIVE WATERING	MG	16.63
0169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	1066
0432-6066	RIPRAP (CL A) (MOW STRIP) (3 IN)	CY	44
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	100
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	100
0543-6002	CABLE BARRIER SYSTEM (TL-4)	LF	1599
0543-6020	CABLE BARRIER TERMINAL SECTION (TL-4)	EA	2



NOTES:
1. ALL RIGHT-OF-WAY LINES ARE APPROXIMATE. VERIFY LOCATIONS AS NECESSARY
2. CABLE BARRIERS ARE DESIGNED TO BE PLACED ON 6:1 (16.67%) OR FLATTER SIDE SLOPES. TOPOGRAPHICAL SURVEYING WAS NOT PERFORMED ON THIS PROJECT. BASELINE COINCIDENCES WITH THE FLOWLINE OF DITCH. CABLE BARRIER LOCATIONS MAY BE ADJUSTED AS NEEDED TO FIT FIELD CONDITIONS AS DIRECTED BY THE ENGINEER.
3. CABLE BARRIERS SHALL BE PLACED WITH AT LEAST 12 FEET OFFSET FROM EDGE OF THE TRAVEL LANE. CABLE BARRIERS SHALL BE PLACED AT LEAST 8 FEET FROM THE BOTTOM OF THE DITCHLINE. OFFSET OF AT LEAST 5 FEET FROM THE EDGE OF ILLUMINATION POLE IS RECOMMENDED.
4. UTILITY LOCATIONS ARE APPROXIMATE. ALL UTILITIES ARE SHOWN BASED ON AVAILABLE AS-BUILT DRAWINGS AND 811 UTILITY LOCATE. CONTRACTOR MUST FIELD VERIFY THE EXACT LOCATION OF EXISTING ROW, POLES, ELECTRICAL SERVICES, GROUND BOXES, AND OTHER PERTINENT ITEMS BEFORE COMMENCING WORK.



NOTES CONTINUED:
5. THE CONTRACTOR MUST COORDINATE WITH THE UTILITY COMPANIES TO VERIFY THE LOCATION OF EXISTING OVERHEAD AND UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION TO AVOID CONFLICTS WITH, OR DAMAGE TO, THESE UTILITIES.
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8. MOW STRIP SHALL BE 36 INCHES WIDE UNLESS OTHERWISE SPECIFIED BE THE ENGINEER.
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10. NO WORK THAT COULD HAVE AN IMPACT TO THE EXISTING FEMA 100YR WSEL IS BEING PROPOSED FOR THIS PROJECT.
11. FPA NOTIFICATION FOR ATASCOSA COUNTY WAS SUBMITTED IN WRITING ON MARCH,19,2024.

LEGEND

- OH E — EXIST OVERHEAD ELECTRIC LINE
- OH C — EXIST OVERHEAD COMMUNICATION LINE
- EXIST DRAINAGE STRUCTURE
- APPARENT R.O.W.
- PROPOSED CABLE BARRIER FENCE WITH 3' MOW STRIP
- TL-4 CABLE BARRIER TERMINAL
- TEMP SEDMT CONT FENCE
- TRAFFIC FLOW ARROWS

STATE OF TEXAS
JUSTIN W. CLARK
118715
LICENSED
PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 3/19/2024 DATE

STATE OF TEXAS
GILMER D. GASTON
80472
LICENSED
PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 3/19/2024 DATE

0 50 100 150
SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

US 281: CABLE BARRIER

PROPOSED CABLE BARRIER LAYOUT

STA 2120+00 TO STA 2140+00

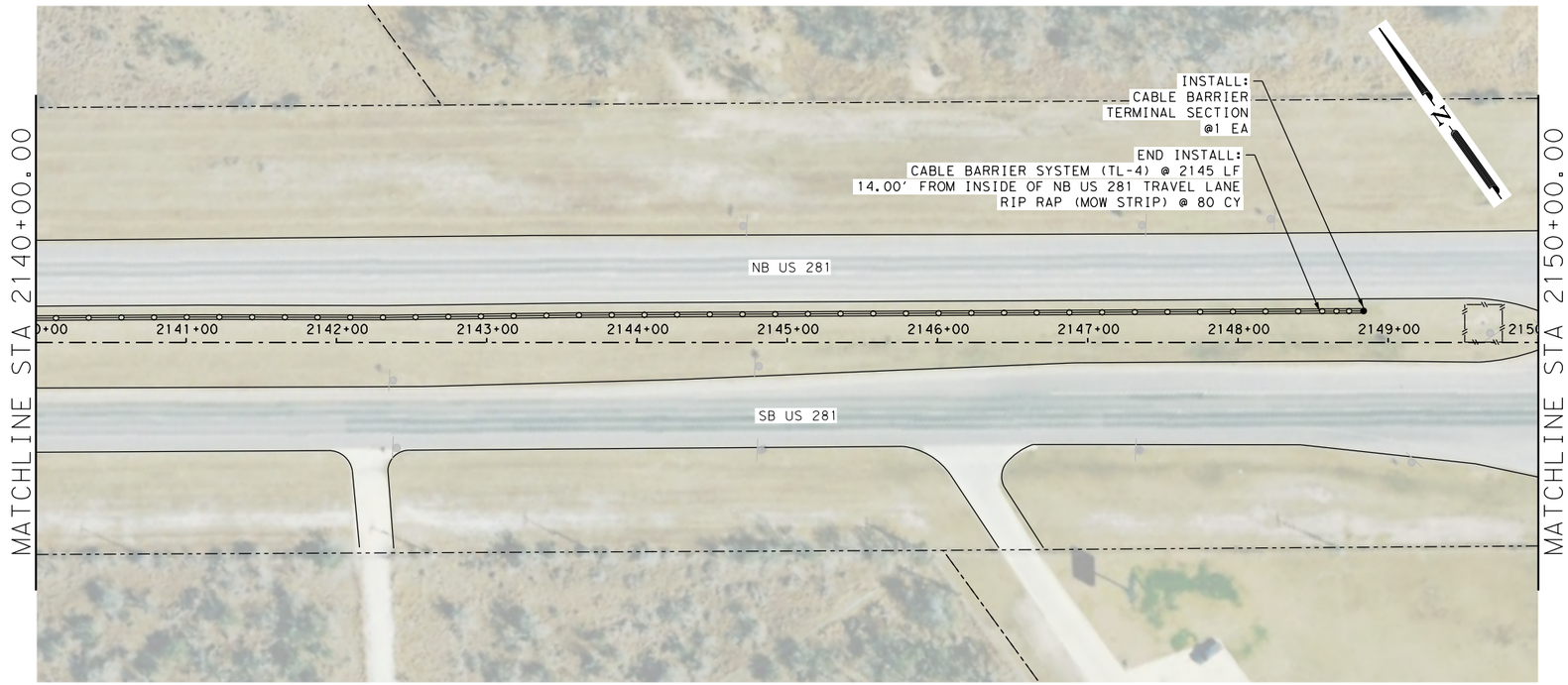
SHEET 33 OF 34

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	66

Plotted on: 3/19/2024

Design Filename: P:\122\96\02\Tasks\13_US 281 Cable Barrier\Design\Civil\Roadway\1229502_13_RDWY33.dgn

ITEM	DESCRIPTION	UNIT	QTY
0132-6021	EMBANKMENT (VEHICLE)(ORD COMP)(TY C)	CY	6
0150-6002	BLADING	HR	5.0
0164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	569
0164-6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	569
0168-6001	VEGETATIVE WATERING	MG	8.88
0169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	SY	569
0432-6066	RIPRAP (CL A) (MOW STRIP) (3 IN)	CY	24
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	100
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	100
0543-6002	CABLE BARRIER SYSTEM (TL-4)	LF	854
0543-6020	CABLE BARRIER TERMINAL SECTION (TL-4)	EA	1



NOTES:
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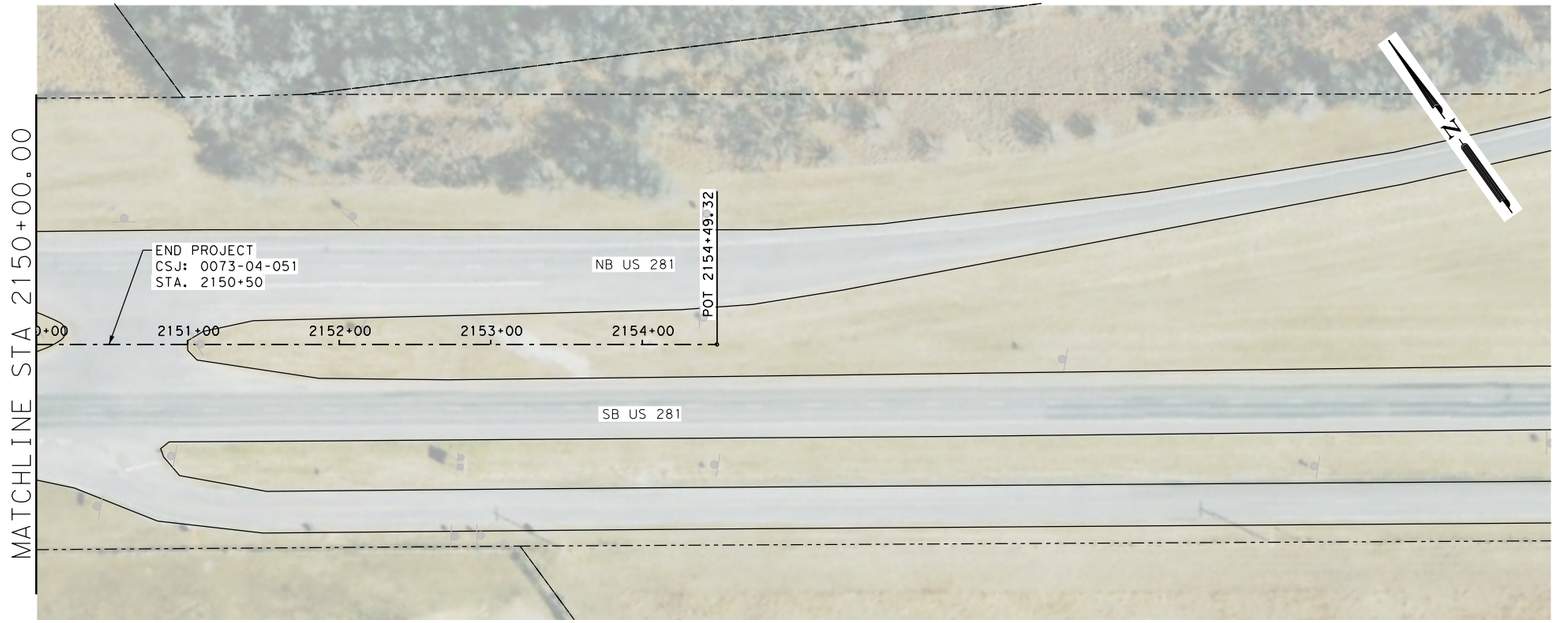

NOTES CONTINUED:
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LEGEND

- OH E — EXIST OVERHEAD ELECTRIC LINE
- OH C — EXIST OVERHEAD COMMUNICATION LINE
- EXIST DRAINAGE STRUCTURE
- APPARENT R.O.W.
- PROPOSED CABLE BARRIER FENCE WITH 3' MOW STRIP
- TL-4 CABLE BARRIER TERMINAL
- TEMP SEDMT CONT FENCE
- TRAFFIC FLOW ARROWS

STATE OF TEXAS — JUSTIN W. CLARK — 118715 — LICENSED PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E. — 3/19/2024 DATE

STATE OF TEXAS — GILMER D. GASTON — 80472 — LICENSED PROFESSIONAL ENGINEER

GILMER D. GASTON, P.E. — 3/19/2024 DATE

0 50 100 150

SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

US 281: CABLE BARRIER

PROPOSED CABLE BARRIER LAYOUT

STA 2140+00 TO END PROJECT

SHEET 34 OF 34

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET			US 281
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	BEXAR	0073	02	088,ETC	67

Plotted on: 3/19/2024
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DATE:
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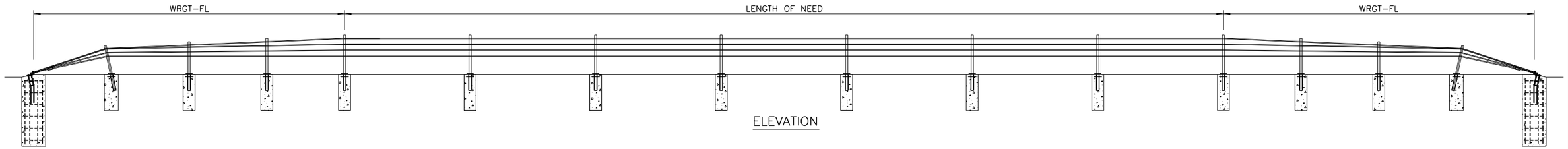
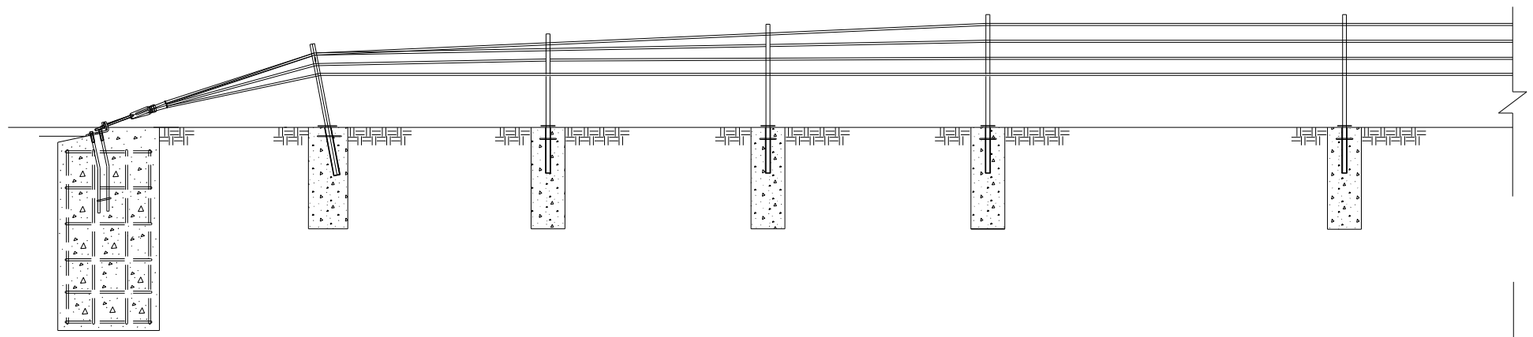
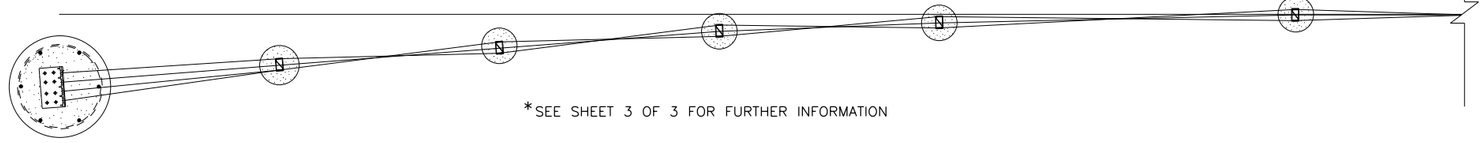


ELEVATION

PLAN

WRGT-FL END ANCHOR





*SEE SHEET 3 OF 3 FOR FURTHER INFORMATION

ROPE TENSION TABLE		
ROPE TEMP (°F)	TENSION (LBS)	TENSION (kN)
0	5700	25.4
5	5550	24.7
10	5400	24.0
15	5250	23.4
20	5100	22.7
25	4950	22.0
30	4800	21.4
35	4650	20.74
40	4500	20.0
45	4350	19.3
50	4200	18.7
55	4050	18.0
60	3900	17.3
65	3750	16.7
70	3600	16.0
75	3450	15.3
80	3300	14.7
85	3150	14.0
90	3000	13.3
95	2850	12.7
100	2700	12.0
105	2550	11.3
110	2400	10.7
115	2250	10.0
120	2100	9.3
125	1950	8.7
130	1800	8.0
135	1650	7.3
140	1500	6.7

*ROPE TENSION: ± 20% AFTER 2-WEEK INTERVAL

GENERAL NOTES:

1. BRIFEN DRAWINGS, SPECIFICATIONS, AND PRODUCT MANUAL SHOULD BE REVIEWED PRIOR TO STARTING AN INSTALLATION. FOR ADDITIONAL INFORMATION OR QUESTIONS, CONTACT BRIFEN USA, INC. AT 1-866-427-4336.

2. THE BRIFEN WRSF HAS BEEN SUCCESSFULLY TESTED TO NCHRP 350 TL-4 CONDITIONS ON SLOPES 6:1 OR FLATTER AND NCHRP 350 TL-3 CONDITIONS ON SLOPES 4:1 TO 6:1.

3. THE POST SPACING SHALL BE DETERMINED BY THE SPECIFYING AGENCY. POST SPACING MAY BE DECREASED TO AVOID OBSTRUCTIONS OR UTILITIES. IN NO EVENT SHALL THE POST SPACING EXCEED 21'-0".

4. BRIFEN WRSF SHALL BE PLACED ON A SMOOTH SURFACE, WITHOUT HUMPS, DROP-OFFS, HOLES, ETC THAT WOULD INTERFERE WITH THE STABILITY OF THE ERRANT VEHICLE. GRADING, FILL AND COMPACT MAY BE REQUIRED TO ASSURE THAT ROPES ARE INSTALLED AT THE DESIGN HEIGHT.

5. THE WRGT-FL END ANCHOR HAS BEEN SUCCESSFULLY TESTED TO NCHRP 350 TL-3 CONDITIONS. THE LENGTH OF NEED BEGINS 31'-0" FROM THE END ANCHOR. POSTS A THROUGH POST B3, SPACED 6'-6" APART, HAVE WEAKENED CUTS AT THE GROUND THAT SHALL FACE THE ANCHOR.

6. ANCHOR AND LINE POST DIMENSIONS AND STEEL REINFORCEMENT WILL BE DETERMINED ON PROJECT SPECIFIC SOIL CLASSIFICATION, PROPERTIES AND TEMPERATURE EXTREMES. CONTACT BRIFEN USA, INC. FOR ADDITIONAL INFORMATION.

7. ALL REINFORCEMENT AND CONCRETE FOR THE ANCHORS AND LINE POSTS PROVIDED BY OTHERS.

8. REINFORCEMENT AND CONCRETE PROPERTIES SHALL MEET AGENCY SPECIFICATIONS.

9. FOR PLACEMENT NEAR GUARDRAIL OR OTHER OBSTACLES CONTACT BRIFEN USA, INC. FOR ADDITIONAL DRAWINGS AND SUPPORT.

10. TAPER RATES FOR THE BRIFEN WRSF ARE AS FOLLOWS:
    HORIZONTAL: 25:1 MAXIMUM, 50:1 PREFERABLE
    VERTICAL: 25:1 MAXIMUM, 50:1 PREFERABLE

Texas Department of Transportation

Design Division Standard

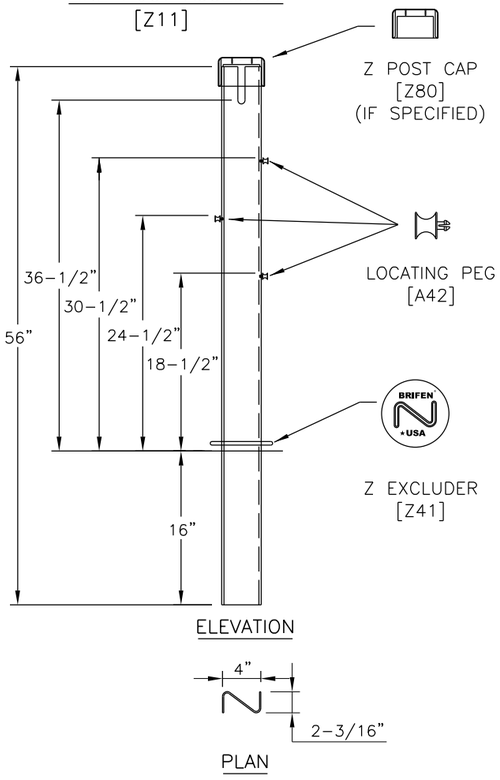
BRIFEN
WIRE ROPE SAFETY FENCE
(TL-4)

BRIFEN(TL4)-14

FILE: brifent1414.dgn	DN: TxDOT	CK: RM	DW: VP	CK:
©TxDOT: MARCH 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	007302		088,ETC	US 281
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		68

DATE:
FILE:

LINE POST ASSEMBLY
[Z11]



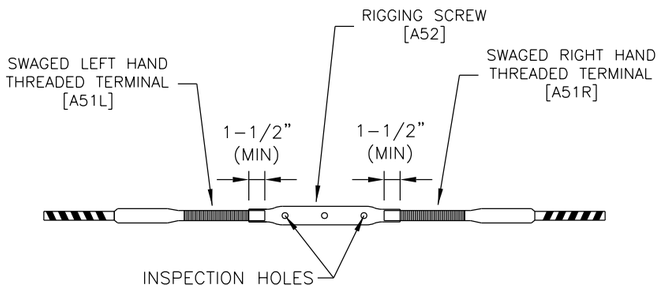
ELEVATION

PLAN

NOTES SPECIFIC TO LINE POST ASSEMBLY

1. ROPE HEIGHTS SHALL BE ±1" TO GROUND LINE.
2. POST SHALL BE ±4" FROM VERTICAL PLUMB.
3. POST CAPS SHALL BE USED IF SPECIFIED.
4. REFLECTORS SHALL BE SPACED ACCORDING TO AGENCY SPECIFICATIONS.
5. REFLECTORS CAN BE PLACED ON THE POST CAP OR POST.

ROPE CONNECTION DETAIL

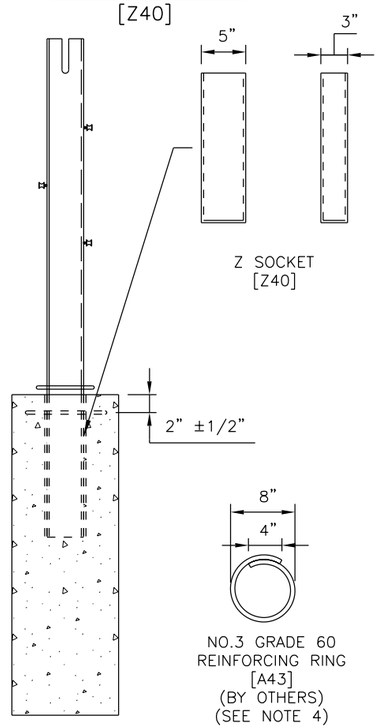


NOTES SPECIFIC TO ROPE CONNECTION DETAIL

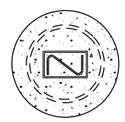
1. THE WIRE ROPE TERMINALS SHALL BE THREADED A MINIMUM OF 1-1/2" INTO RIGGING SCREW.
2. AFTER FINAL TENSIONING, THE TERMINALS SHALL BE VISIBLE IN THE INSPECTION HOLES.

SOCKET ASSEMBLY

CONCRETE FOOTING
[Z40]



ELEVATION

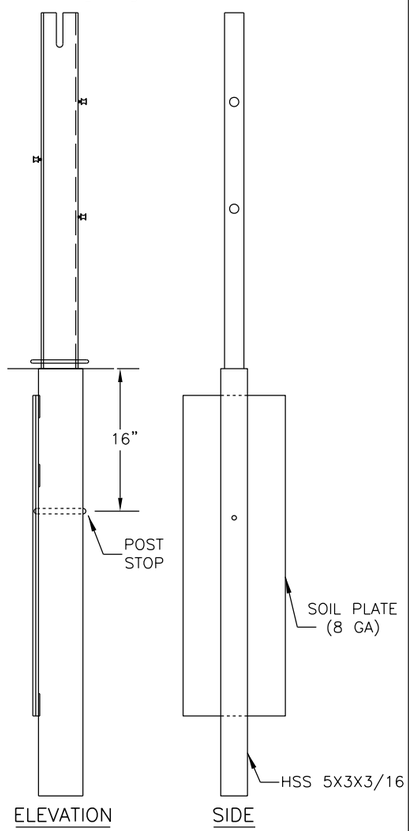


PLAN

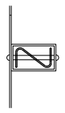
NOTES SPECIFIC TO CONCRETE FOOTING

1. SIZE OF FOOTING WILL BE DETERMINED BY SOIL CONDITIONS, FOUNDATION TYPE AND PROJECT CONDITIONS.
2. CONCRETE BASED ON AGENCY SPECIFICATIONS.
3. CONCRETE BY OTHERS.
4. REINFORCING RING (BY OTHERS) WILL BE USED ACCORDING TO FOUNDATION SIZE AND TYPE. THE REINFORCEING RING MAY BE OMITTED IF THE FOOTING IS PLACED IN A CONTINOUS CONCRETE MOW STRIP.
5. FOOTING SHALL BE FLUSH WITH THE GROUND LINE, TO A MAXIMUM OF 1 INCH BELOW OR ABOVE GROUND LINE.
6. SOCKET SHALL BE ±2° OF VERTICAL PLUMB.

DRIVE SOCKET
[Z44]



ELEVATION SIDE



PLAN

NOTES SPECIFIC TO DRIVE SOCKETS

1. SIZE OF SOIL PLATE WILL BE DETERMINED BY SOIL CONDITIONS AND PROJECT CONDITIONS.
2. THE SOIL PLATE SHALL BE PARALLEL TO ROADWAY AND CAN FACE TOWARD OR AWAY FROM THE TRAVEL LANE.
3. FOOTING SHALL BE FLUSH WITH THE GROUND LINE, TO A MAXIMUM OF 1 INCH BELOW OR ABOVE GROUND LINE.
4. SOCKET SHALL BE ±2° OF VERTICAL PLUM.
5. SOCKETS SHALL BE DRIVEN IN A MANNER TO NOT DISTORT OR DESTROY THE TOP OF SOCKET TO A DEGREE THAT PLACES THE SOCKET OR LINE POST OUT OF CONSTRUCTION TOLERANCES.

GENERAL NOTES:

1. BRIFEN DRAWINGS, SPECIFICATIONS, AND PRODUCT MANUAL SHOULD BE REVIEWED PRIOR TO STARTING AN INSTALLATION. FOR ADDITIONAL INFORMATION OR QUESTIONS, CONTACT BRIFEN USA, INC. 1-866-427-4336.
2. THE BRIFEN WRSF HAS BEEN SUCCESSFULLY TESTED TO NCHRP 350 TL-4 CONDITIONS ON SLOPES 6:1 OR FLATTER AND NCHRP 350 TL-3 CONDITIONS ON SLOPES 4:1 TO 6:1.
3. THE POST SPACING SHALL BE DETERMINED BY THE SPECIFYING AGENCY. POST SPACING MAY BE DECREASED TO AVOID OBSTRUCTIONS OR UTILITIES. IN NO EVENT SHALL THE POST SPACING EXCEED 21'-0".
4. BRIFEN WRSF SHALL BE PLACED ON A SMOOTH SURFACE, WITHOUT HUMPS, DROP-OFFS, HOLES, ETC THAT WOULD INTERFERE WITH THE STABILITY OF THE ERRANT VEHICLE. GRADING, FILL AND COMPACTION MAY BE REQUIRED TO ASSURE THAT ROPES ARE INSTALLED AT THE DESIGN HEIGHT.

Texas Department of Transportation

Design Division Standard

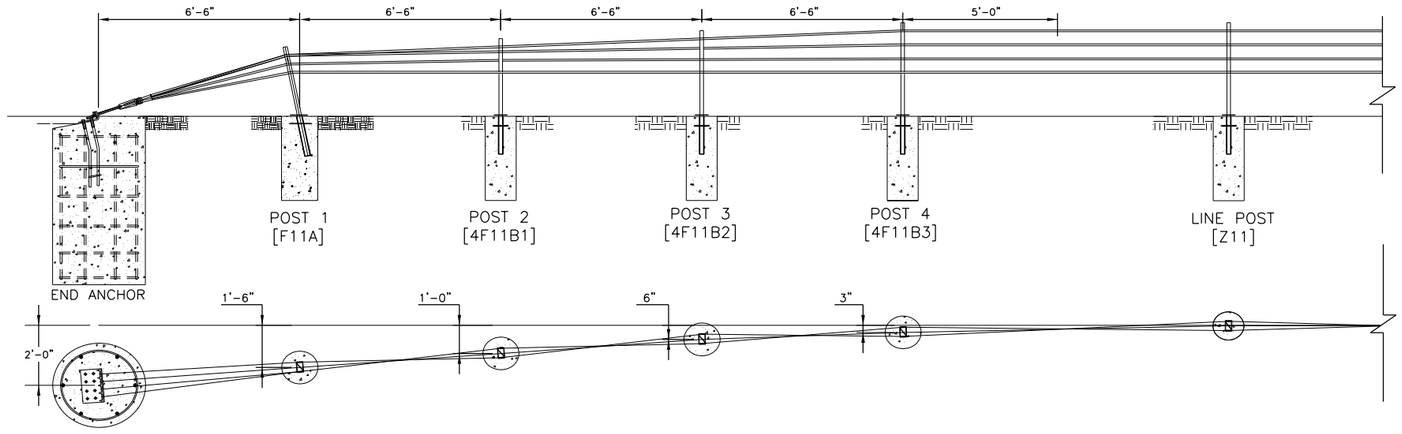
BRIFEN
WIRE ROPE SAFETY FENCE
(TL-4)

BRIFEN(TL4)-14

FILE: brifentl414.dgn	DN: TxDOT	CK: RM	DW: VP	CK:		
©TxDOT: MARCH 2014	CONT	SECT	JOB		HIGHWAY	
REVISIONS	007302		088,ETC		US 281	
	DIST	COUNTY			SHEET NO.	
	SAT	BEXAR			69	

DATE:
FILE:

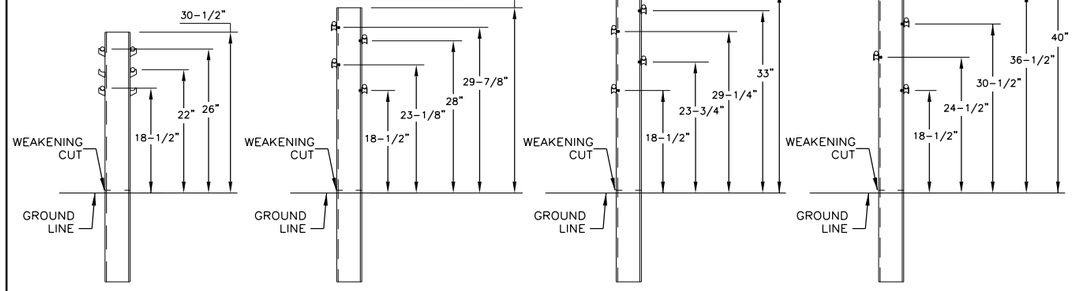
WRGT-FL END ANCHOR LAYOUT



GENERAL NOTES:

1. BRIFEN DRAWINGS, SPECIFICATIONS, AND PRODUCT MANUAL SHOULD BE REVIEWED PRIOR TO STARTING AN INSTALLATION. FOR ADDITIONAL INFORMATION OR QUESTIONS, CONTACT BRIFEN USA, INC. AT 1-866-427-4336.
2. THE WRGT-FL END ANCHOR HAS BEEN SUCCESSFULLY TESTED TO NCHRP 350 TL-3 CONDITIONS. THE LENGTH OF NEED BEGINS 31'-0" FROM THE END ANCHOR. POSTS A THROUGH POST B3, SPACED 6'-6" APART, HAVE WEAKENED CUTS AT THE GROUND THAT SHALL FACE THE ANCHOR.
3. ANCHOR AND LINE POST DIMENSIONS AND STEEL REINFORCEMENT WILL BE DETERMINED ON PROJECT SPECIFIC SOIL CLASSIFICATION, PROPERTIES AND TEMPERATURE EXTREMES. CONTACT BRIFEN USA, INC. FOR ADDITIONAL INFORMATION.
4. ALL REINFORCEMENT AND CONCRETE FOR THE ANCHORS AND LINE POSTS PROVIDED BY OTHERS.
5. REINFORCEMENT AND CONCRETE PROPERTIES SHALL MEET AGENCY SPECIFICATIONS.
6. FOR PLACEMENT NEAR GUARDRAIL OR OTHER OBSTACLES CONTACT BRIFEN USA, INC. FOR ADDITIONAL DRAWINGS AND SUPPORT.

WRGT-FL POST DETAILS

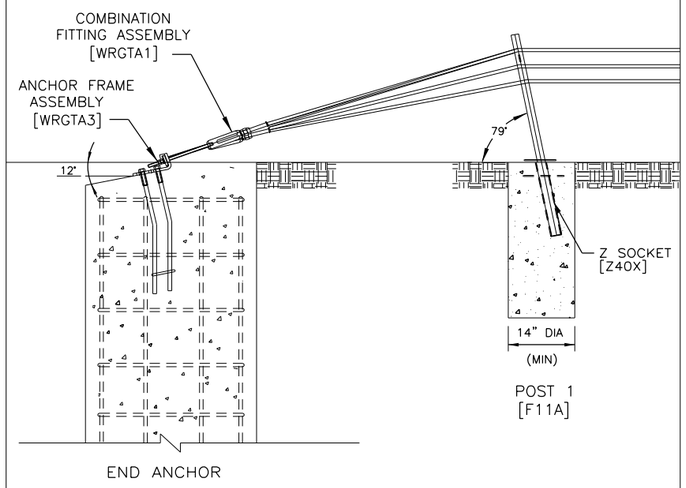


POST 1 [F11AL] | POST 2 [4F11B1L] | POST 3 [4F11B2L] | POST 4 [4F11B3L]

NOTES SPECIFIC TO WRGT-FL POST DETAIL

1. ROPE HEIGHTS SHALL BE ±1" TO GROUND LINE.
2. POST SHALL BE ±4" FROM VERTICAL PLUMB.
3. POST CAPS SHALL BE USED IF SPECIFIED.
4. REFLECTORS SHALL BE SPACED ACCORDING TO AGENCY SPECIFICATIONS.
5. REFLECTORS CAN BE PLACED ON THE POST CAP OR POST.
6. Z EXCLUDER (Z41) SHALL BE USED.
7. POST A & SOCKET SHALL BE PLACED 79° (±4°) TOWARD END ANCHOR FROM THE HORIZONTAL PLANE.
8. POST A SOCKET SHALL BE PLACED IN 14" (MIN) CONCRETE FOUNDATION. DEPTH TO BE DETERMINED FROM SOIL CONDITIONS AND PROJECT CONDITIONS.
9. FOUNDATIONS FOR POST 2 THRU 4 SHALL BE THE SAME AS THE LINE POST ASSEMBLY'S FOR THE PROJECT.
10. WEAKENED CUTS SHALL FACE END ANCHOR.

END ANCHOR DETAILS

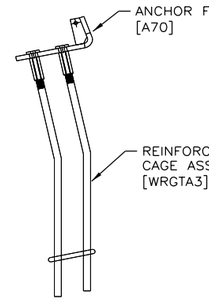


NOTES SPECIFIC TO END ANCHOR DETAIL

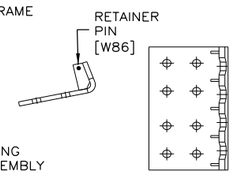
1. THE END ANCHOR ASSEMBLY SHALL BE PLACED 12" (+3", −1") BELOW HORIZONTAL PLANE.
2. POST 1 & SOCKET SHALL BE PLACED 79° (±4°) TOWARD END ANCHOR FROM THE HORIZONTAL PLANE.
3. POST 1 SOCKET SHALL BE PLACED IN 14" (MIN) CONCRETE FOUNDATION. DEPTH TO BE DETERMINED FROM SOIL CONDITIONS AND PROJECT CONDITIONS.

END ANCHOR COMPONENTS

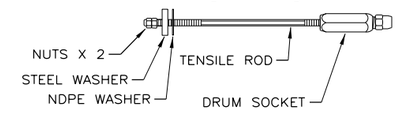
ANCHOR FRAME ASSEMBLY



ANCHOR FRAME [A70]



COMBINATION FITTING [WRGTA1]



SHEET 3 OF 3

Texas Department of Transportation | Design Division Standard

BRIFEN
WIRE ROPE SAFETY FENCE
(TL-4)

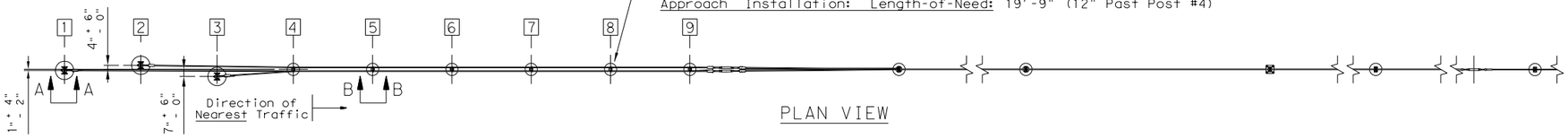
BRIFEN(TL4)-14

FILE: brifentl414.dgn	DN: TxDOT		CK: RM	DW: VP		CK:	
©TxDOT: MARCH 2014	CONT	SECT	JOB		HIGHWAY		
REVISIONS	007302		088,ETC		US 281		
	DIST	COUNTY				SHEET NO.	
	SAT	BEXAR				70	

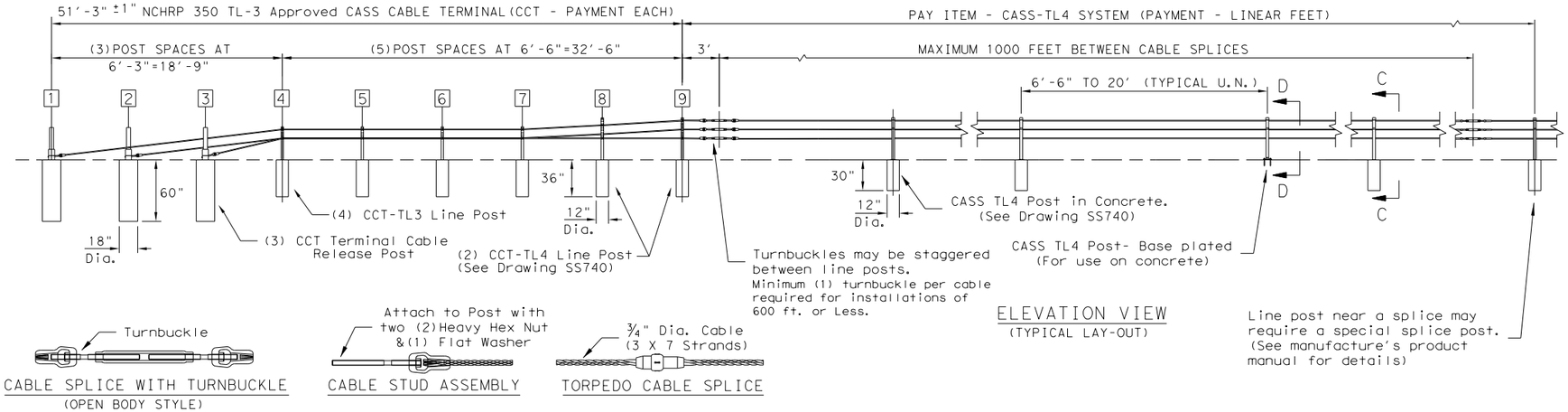
DATE: 3/19/2024
FILE: P:\122\96\02\Tasks\13_US 281 Cable Barrier\Design\Civil\Standards\Roadway\casst1414.dgn

Preferred Installation: Locate post #2 away from nearest traffic.
System has been succesfully tested with opposite installation.

Length-of-Need Cass Cable Terminal (CCT):
Departure Installation: Length-of-Need: 44'-9" (At Post #8)
Approach Installation: Length-of-Need: 19'-9" (12" Past Post #4)



PLAN VIEW



ELEVATION VIEW
(TYPICAL LAY-OUT)

CABLE SPLICE WITH TURNBUCKLE
(OPEN BODY STYLE)

CABLE STUD ASSEMBLY

TORPEDO CABLE SPLICE

GENERAL NOTES

1. This drawing is a generql overview of CASS TL-4 Barrier System. See SS-740 (latest version) for specific details of CASS cable terminal (CCT) and cable safety system (CASS) requirements, proper installation, options and specification.
2. CASS is designed for bi-directional traffic flows and can be installed on either side of the median. Contact Trinity (800-527-6050) or consult the design, installation, or repair manual(s) for additional information.
3. All concrete for CASS footings shall be TxDOT class A. If class A or stronger concrete is utilized for the mowstrip, please see chart below for allowable footing depth and sleeve deviations.
4. All posts shall be socketed unless otherwise specified. All cables shall be pre-stretched unless otherwise specified.
5. For payment see Special Specification "Cable Barrier System".
6. CASS-TL4 shall be installed on shoulders or medians with slopes of 6:1 or flatter without obstructions, depressions, etc. That may significantly affect the stability of an errant vehicle. Grading of site and/or appropriate fill materials may be required. The designer/installer shall "Flatten" or "Round" various topographical inconsistencies that could interfere with the ability of the installer to consistently maintain the design height (in relation to the terrain) of the cables. Please consult manual(s) and / or TxDOT Memo(s) for installations in "Ditch Sections".
7. CASS TL-4 post spacing may be modified to avoid obstacles that conflict with the installation of cass-tl4 line posts or to reduce deflection on radiuses. No post space can exceed the maximum post TxDOT space limit of 20'. Reducing or increasing post spacing affects deflection. CASS TL-4 may be laterally transferred at a rate not to exceed 30:1.
8. Post foundations may be drilled through existing pavement. Please see line post foundation chart for minimum footing requirements in various applications.
9. For aesthetic purposes Trinity recommends all sleeves, driven posts, and lower cable release posts to be installed reasonably plumb (approximately 1/8" per foot).
10. CASS TL-4 shall be installed in well-drained, compacted, NCHRP Report 350 Standard soil. If soil does not meet this classification, if solid rock/concrete is encountered below grade or if soil is susceptable to severe freeze/thaw cycles, please contact Trinity about alternate footing design(s). Trinity suggests the use of "Mow strips" for erosion prevention and ease of maintenance / installation.
11. See the Texas MUTCD for proper "Barrier" Delineation.

MOW STRIP DETAIL*			CONCRETE FOOTING CHART		
MOW STRIP	DEPTH	WIDTH	FOOTING	TUBE SLEEVE	REBAR RING
NONE			30" Min.	27" Min.	YES
HMA	6" Min.	3' Min.	27" Min.	15" Min.	NO
HMA	8" Min.	3' Min.	24" Min.	15" Min.	NO
RC	3" Min.	3' Min.	24" Min.	15" Min.	NO

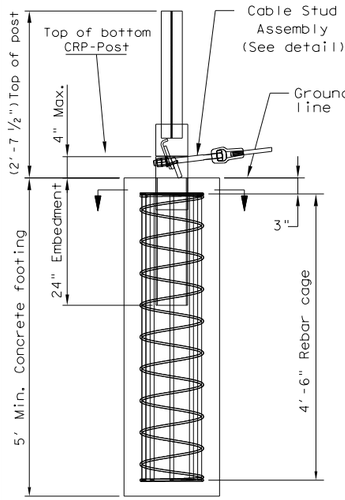
Chart does not apply to Terminal Posts 1 thru 9.
* Mow strip or pavement.
HMA = Hot Mix Asphalt (Not Recycled Asphalt Pavement).
RC = Reinforced Concrete (TxDOT Class A Minimum).

CABLE TENSION CHART	
FAHRENHEIT	PRE-STRETCHED
DEGREES	LB / FORCE
-10	7300
0	7000
10	6600
20	6300
30	6000
40	5600
50	5300
60	5000
70	4600
80	4300
90	4000
100	3600
110	3300
120	3000
130	2700
140	2500
150	2300

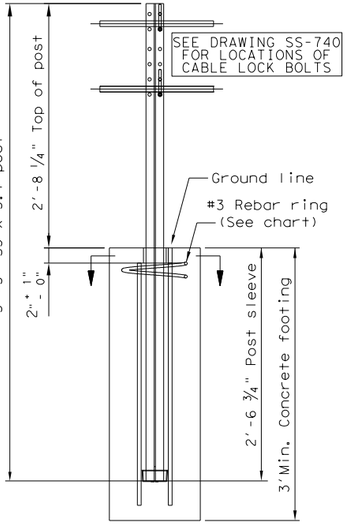
Allowable deviation from chart in tangent sections: +800, -200 pounds/force. Cable tension readings are typically higher in curved cable sections.

Trinity Highway Products, LLC.
2525 Stemmons Freeway
Dallas, TX 75207
Phone: (800) 644-7976

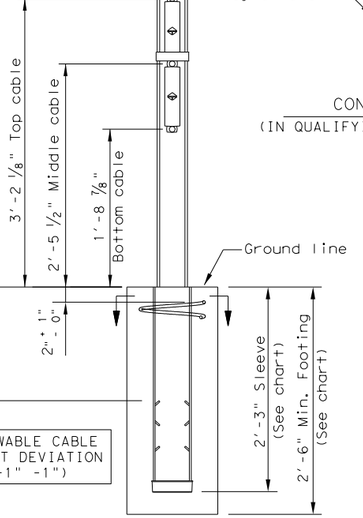
Product.INFO@TRIN.NET



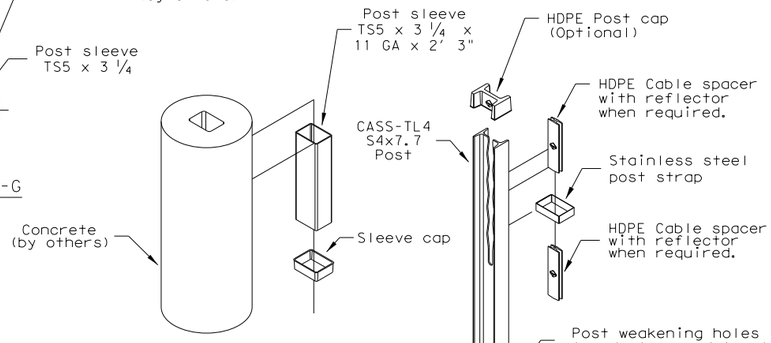
SECTION E-E



SECTION F-F



SECTION G-G

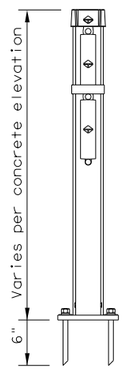


CONCRETE FOOTING
(IN QUALIFYING MOW STRIP SEE CHART)

VIEW A-A
(CABLE RELEASE POST 1-3)

VIEW B-B
(TERMINAL LINE POST 4-7)

SECTION C-C
(SOCKETED POST)



SECTION D-D
(BASE PLATED POST)

STANDARD POST & CONCRETE FOOTING
(SOCKETED POST)

Texas Department of Transportation

Design Division Standard

TRINITY CABLE SAFETY SYSTEM (TL-4)

CASS(TL4)-14

FILE: casst1414.dgn	DN: TxDOT	CK: RM	DW: VP	CK:	
©TxDOT: March 2014	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0073	02	088,ETC	US 281	
	DIST	COUNTY		SHEET NO.	
	SAT	BEXAR		71	

DATE: 3/19/2024
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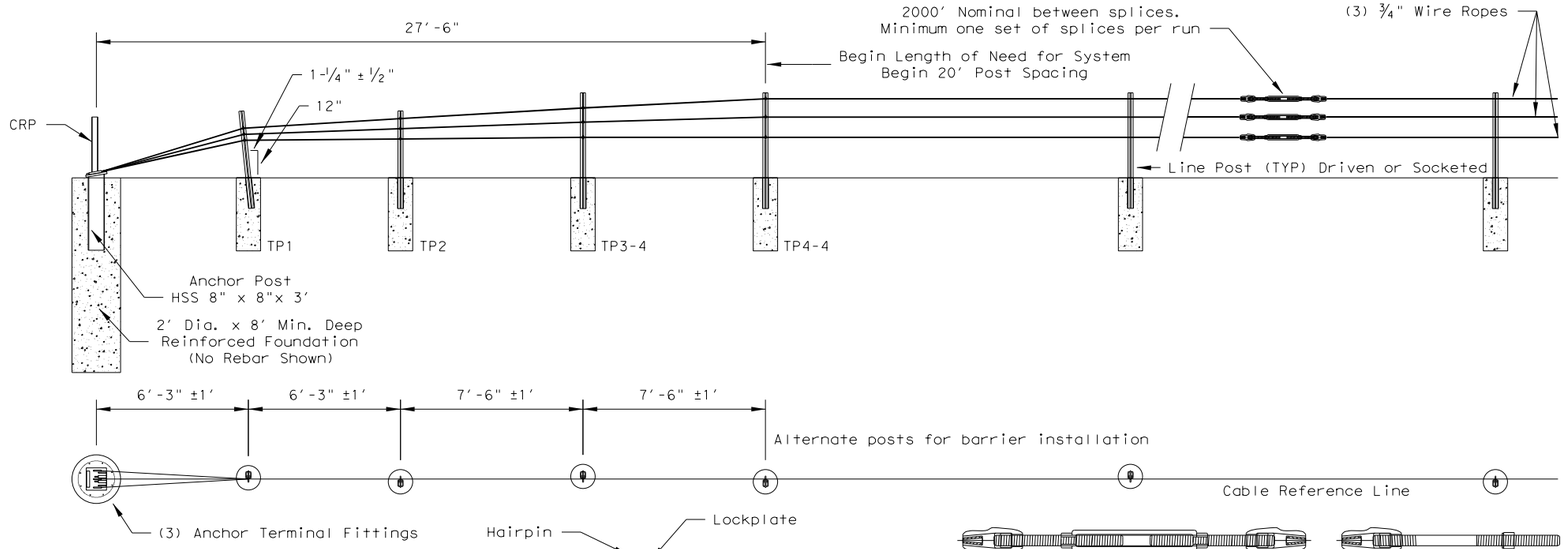
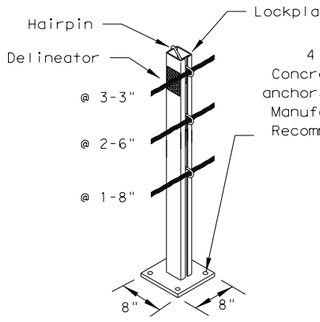
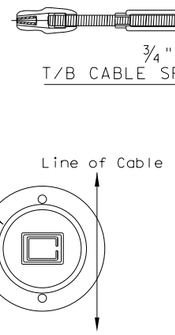
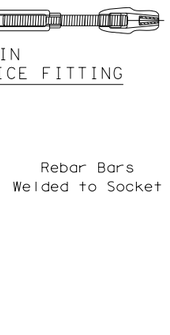




LINE POST
(BASE-PLATED OPTION)
Low-Fill Box Culvert Less than 15" Fill

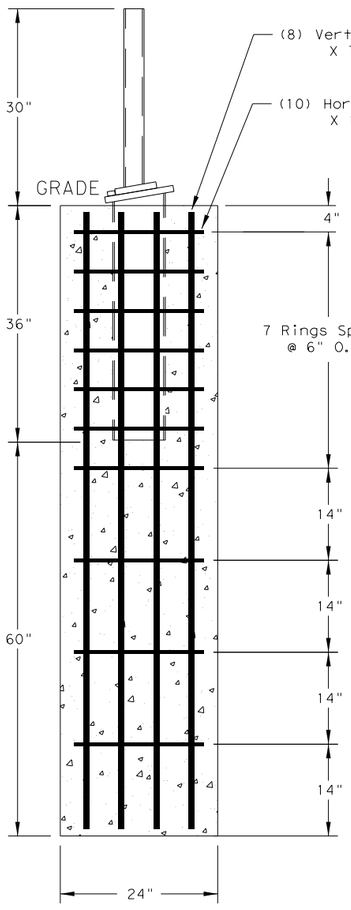


SECTION A

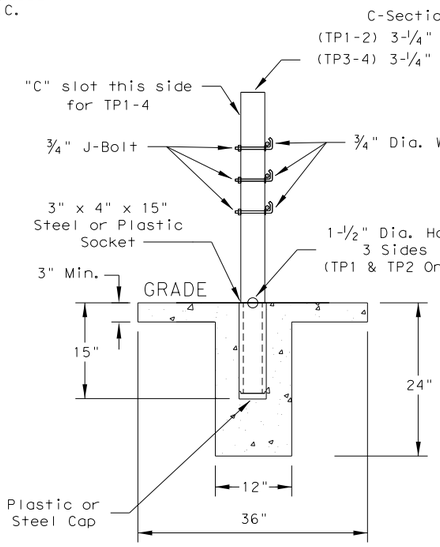


SECTION B

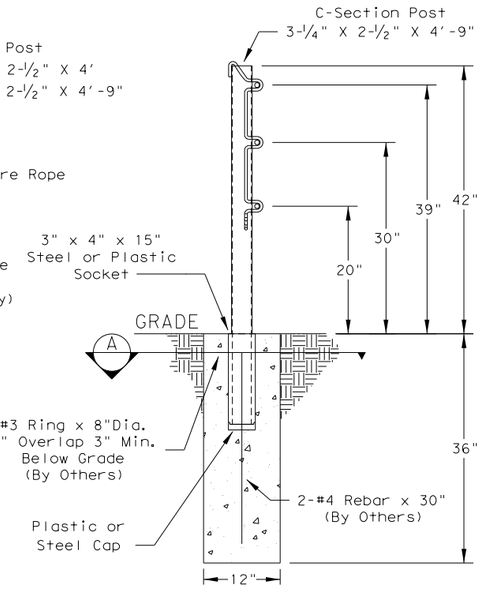
C-SECTION POST



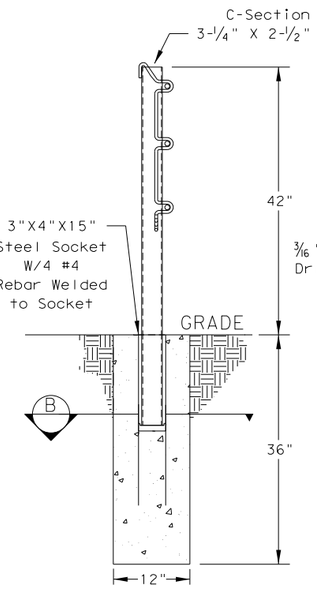
CABLE RELEASE AND ANCHOR POST



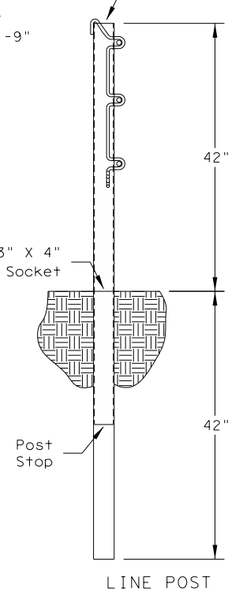
TERMINAL POST
(SHOWN WITH CONCRETE MOWSTRIP)
(Shown with Tube Plate Option)
(See Note 10)



LINE POST SOCKETED
(Shown with Rebar Ring/Bars Socket Option)
(See Note 9)



LINE POST SOCKETED
(Shown with Welded Rebar Socket Option)
(See Note 9)



LINE POST
(DRIVEN OPTION)
(Shown with Driven
Socket Option)
(See Note 9)

GENERAL NOTES

1. For additional information contact Gibraltar, Inc. at 1-800-495-8957, 830-798-5444, or see the manufacturer's product manual.
2. All concrete shall be CLASS A.
3. The Cable Barrier System shall be installed on shoulders or on medians with slopes of 6:1 or flatter. If installed on slopes steeper than 6:1 up to 4:1 the TL-4 system performs as a TL-3 and Gibraltar must be contacted for various guidelines related to placement.
4. The Cable Barrier System is accepted by the FHWA Test Level - 4.
5. See the Texas MUTCD for proper "Barrier" delineation.
6. Rock Clause: Where solid rock is encountered:
   A. For socketed post, continue digging 12" diameter, 15" deep into rock or the required plan depth, whichever comes first.
   B. For driven post, core drill a 4" diameter hole 18" deep into rock or the required plan depth, whichever comes first.
   C. For Anchor post, continue digging 24" diameter, 30" deep into rock or the required plan depth, whichever comes first.
7. Tolerances:
   * LP = 3" out of plumb, at top
   * Cable height = 1"
   * Anchor Post = 5" off of Cable Reference Line
8. The Gibraltar cable barrier system shall be installed in NCHRP Report 350 standard compacted soil. Soil must be well drained.
9. All non-welded rebar by others.
10. Minimum recommended line post foundation.
    A. Without mowstrip, 36" Deep x 12" diameter foundations with #3 rebar ring x 8" diameter with two #4 rebar vertical bars 30" long
    B. With 4" minimum depth hot mix asphalt, 30" deep x 12" diameter foundations with #3 rebar ring x 8" diameter with two #4 rebar vertical bars 30" long.
    C. With 3" minimum depth concrete mowstrip, 24" deep x 12" diameter foundations. (No rebar required)
    D. Direct drive post 42" deep.

CABLE TENSION CHART*	
-10 °F	8000
0 °F	7600
10 °F	7200
20 °F	6800
30 °F	6400
40 °F	6000
50 °F	5600
60 °F	5200
70 °F	4800
80 °F	4400
90 °F	4000
100 °F	3600
110 °F	3200

DEFLECTION	
Deflection	Post Spacing
8'-0"	20 FT
7'-0"	12 FT
6'-8"	10 FT

* Allowable Deviation from Chart +/- 10%

Texas Department of Transportation — Design Division Standard

GIBRALTAR
CABLE BARRIER SYSTEM
(TL-4)

GBRLTR(TL4)-14

FILE: gbrltrt1414.dgn	DN: TxDOT	CK: RM	DW: VP	CK:
©TxDOT: March 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0073	02	088,ETC	US 281
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		72

DATE: 3/19/2024
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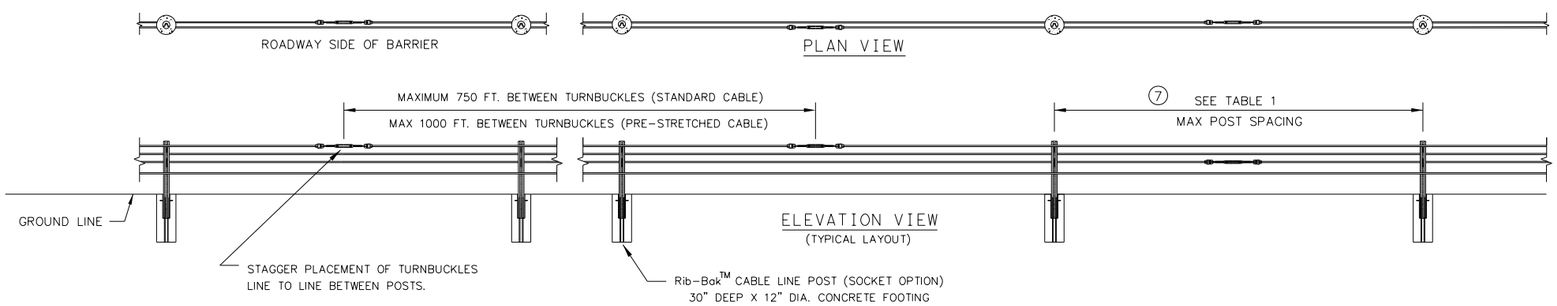
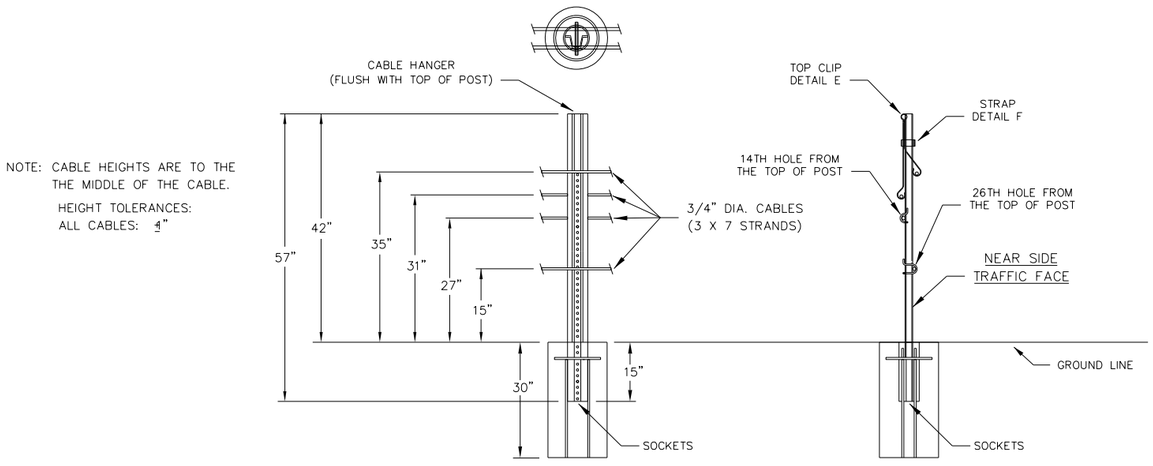
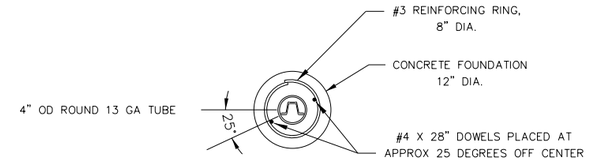


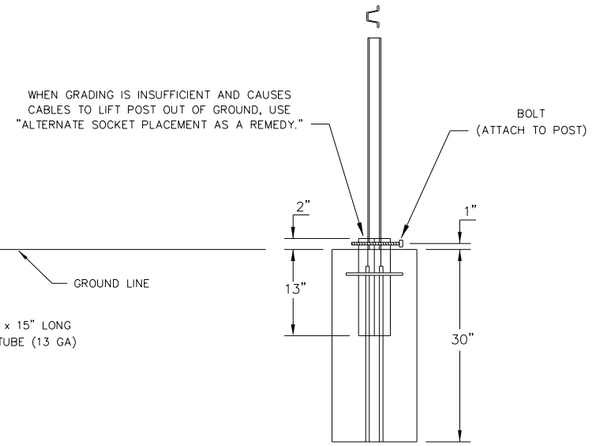


LENGTH OF NEED POSTS
MEDIAN CONFIGURATION

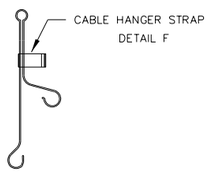
INSTALLATION DETAIL
4 CABLE 6:1



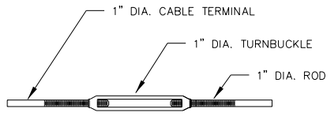
⑪ SOCKETED POST OPTION
(TYPE S POST)



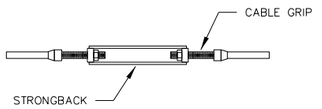
ALTERNATE SOCKET PLACEMENT
(TYPE S POST)



CABLE HANGER BRACKET
DETAIL E
(SUBJECT TO MANUFACTURER'S TOLERANCES)



WEDGED FITTING
TURNBUCKLE DETAIL
(TYPICAL)



STRONGBACK (SELF-SWAGING)
TURNBUCKLE DETAIL
(OPTIONAL)

GENERAL NOTES

1. FOR ADDITIONAL INFORMATION CONTACT YOUR DISTRIBUTOR OR NUCOR STEEL MARION, INC. AT (740) 383-4011.
2. FOR PAYMENT SEE SPECIAL SPECIFICATION "CABLE BARRIER SYSTEM".
3. FOR ADDITIONAL INFORMATION SEE THE MANUFACTURER'S PRODUCT MANUAL.
4. THE NU-CABLE SYSTEM IS DESIGNED FOR BI-DIRECTIONAL TRAFFIC FLOWS. SEE THE MANUFACTURER'S PRODUCT MANUAL FOR PLACEMENT ADJACENT TO GUARDRAIL END TREATMENTS.
5. THE NU-CABLE SYSTEM SHALL BE INSTALLED ON MEDIANS WITH SLOPES OF 6:1 OR FLATTER WITHOUT OBSTRUCTIONS, DEPRESSIONS, ETC; THAT MAY SIGNIFICANTLY AFFECT THE STABILITY OF AN ERRANT VEHICLE.
6. THE NU-CABLE SYSTEM MAY BE INSTALLED ON EITHER SIDE OF THE ROADWAY. Rib-Bak™ CABLE LINE POSTS MAY BE SOCKETED OR DRIVEN DESIGN.
7. THE TL-4 FOR 6:1 SLOPES CAN USE 4# / LF POST. SEE TABLE #1 FOR POST SIZE PER SPACING.
8. SEE (TABLE 2) FOR TENSION AMOUNT AT SPECIFIC CABLE TEMPERATURE FOR INITIAL INSTALLATION.
9. SEE (TABLE 3) FOR TENSION AMOUNT AT SPECIFIC CABLE TEMPERATURE FOR MAINTENANCE.
10. FOURTH (LOWEST) CABLE IS NOT OPTIONAL ON THE TL-4 SYSTEM.
11. CONSULT YOUR PROJECT PLAN SHEETS AND CABLE BARRIER SPECIFICATIONS FOR DESIRED SOCKET MATERIAL.
12. ALL FOUNDATION DESIGNS ARE BASED ON NCHRP 350 STRONG (S1) SOIL. CONSULT THE MANUFACTURER FOR SPECIFIC FOUNDATION DESIGN IF SOIL TYPES DIFFER.

⑦ TABLE 1

POST SIZE TABLE	
POST SPACING	POST SIZE
0' – 17'-6"	4# / LF X 4' OR 6' POST
17'-6" – 20'	5# / LF X 4' POST

POST SPACING IS PER 8 FOOT DEFLECTION REQUIRMENTS.
CONSULT PRODUCT MANUAL IF GREATER DEFLECTION IS PERMISSIBLE.

⑧ TABLE 2

CABLE TENSION CHART	
INITIAL INSTALL	
F	LBF
120	4624
110	4986
100	5350
90	5713
80	6077
70	6440
60	7167
50	7894
40	8619
30	9346
20	10073
10	10800
0	11525
-10	12252
-20	12979
-30	13706

⑨ TABLE 3

CABLE TENSION CHART	
MAINTENANCE	
F	LBF
120	4021
110	4336
100	4652
90	4968
80	5284
70	5600
60	6232
50	6864
40	7495
30	8127
20	8759
10	9391
0	10022
-10	10654
-20	11286
-30	11918

SHEET 1 OF 2

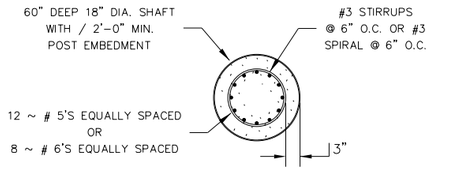
Texas Department of Transportation | Design Division Standard

NU-CABLE BARRIER SYSTEM
(TL-4)
(4 CABLE)

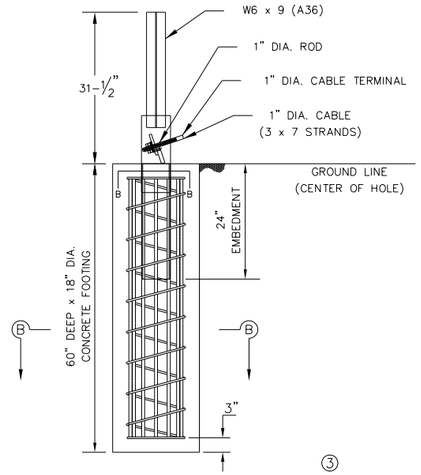
NU-CABLE(TL4)-14

FILE:	DN:	CK:	DW:	CK:
© TxDOT:	CONT	SECT	JOB	HIGHWAY
REVISIONS	0073	02	088,ETC	US 281
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		73

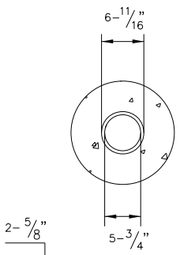
DATE: 3/19/2024
FILE: P:\122\96\02\Tasks\13_US 281 Cable Barrier\Design\Civil\Standards\Roadway\nucable1414.dgn

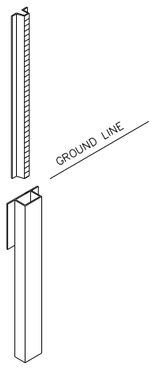


SECTION B–B
(CABLE RELEASE POST)

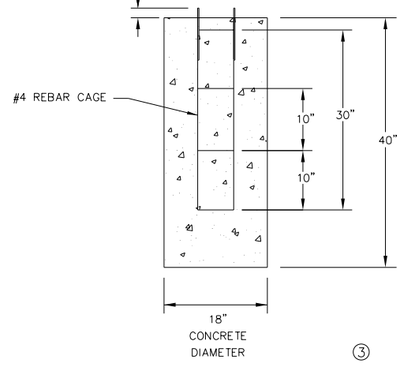


DETAIL A – CRP IN CONCRETE FOOTING
(3000 PSI MIN CONCRETE) ③

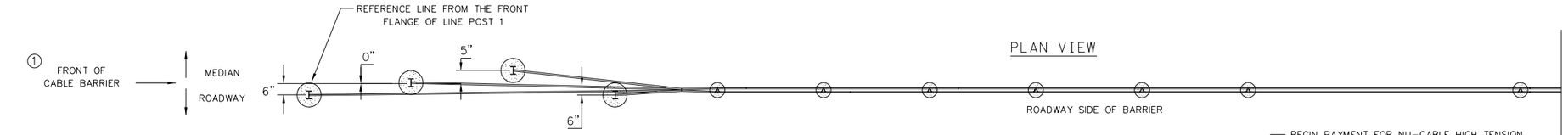




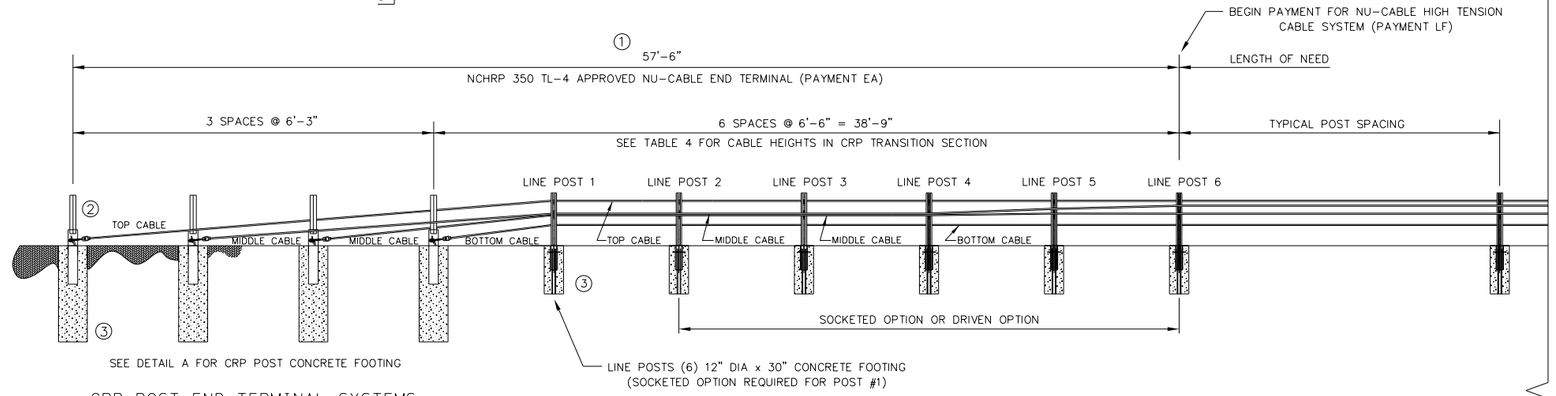
DRIVEN SOCKET OPTION



NU–TEN CONCRETE FOOTING DETAIL ③



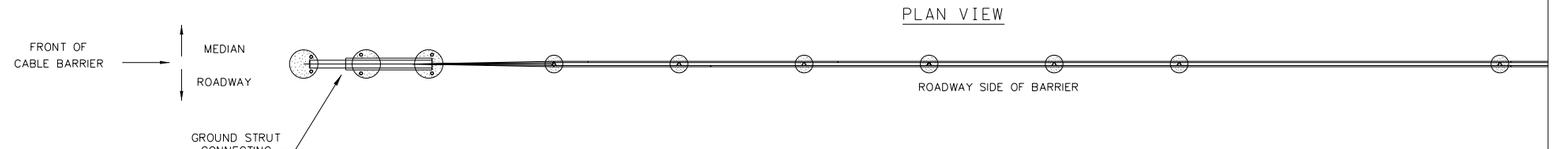
PLAN VIEW



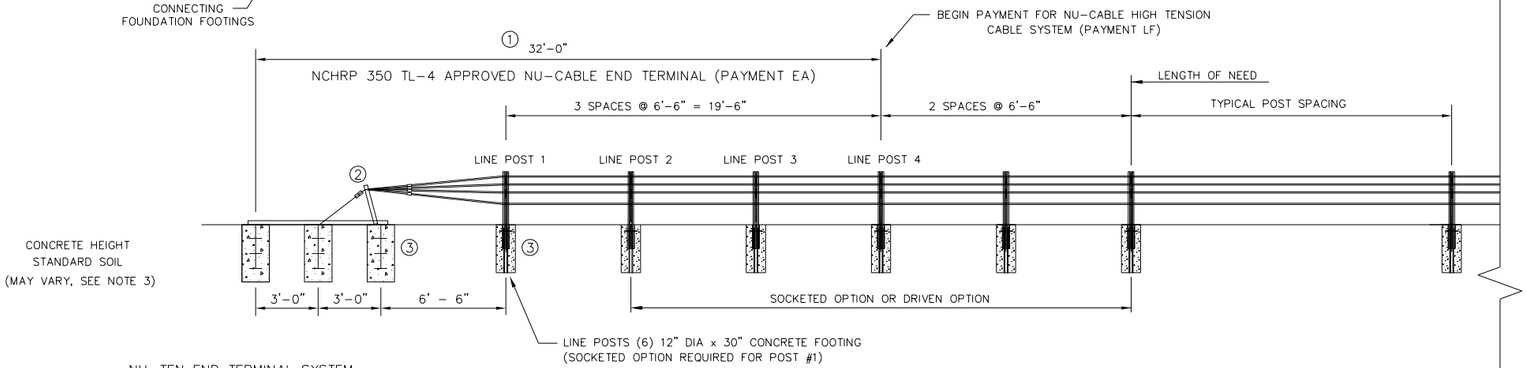
CRP POST END TERMINAL SYSTEMS

ELEVATION VIEW

① THE OPPOSING END TREATMENTS ON A PARTICULAR RUN ARE MIRRORED IN THEIR LAYOUT.



PLAN VIEW



CONCRETE HEIGHT STANDARD SOIL (MAY VARY, SEE NOTE 3)

NU–TEN END TERMINAL SYSTEM

ELEVATION VIEW

④ TABLE 4

CRP END TERMINAL CABLE HEIGHTS - TL-4						
	LP 1	LP 2	LP 3	LP 4	LP 5	LP 6
TOP CABLE	34"	34"	34"	34"	34"	34"
UPPER-MIDDLE CABLE	27"	27"	27"	27"	28"	31"
BOTTOM-MIDDLE CABLE	24"	24"	24"	24"	24"	24"
BOTTOM CABLE	15"	15"	15"	15"	15"	15"

NOTES

1. THE OPPOSING END TREATMENTS ON A PARTICULAR RUN ARE MIRRORED IN THEIR LAYOUT. SYSTEM PAYMENT IS PER EACH (EA). REFER TO PROJECT SPECIFICATIONS FOR ADDITIONAL PAYMENT INFORMATION
2. REFER TO INSTALLATION MANUAL FOR CABLE END ASSEMBLY DETAIL.
3. ALL FOUNDATION DESIGNS ARE BASED ON NCHRP 350 STRONG (S1) SOIL. CONSULT THE MANUFACTURER FOR SPECIFIC FOUNDATION DESIGNS IF SOIL TYPES DIFFER.
4. SEE TABLE 4 CABLE HEIGHTS IN CRP TRANSITION SECTION.

Texas Department of Transportation

Design Division Standard

NU-CABLE BARRIER SYSTEM (TL-4) (4 CABLE)

NU-CABLE(TL4)-14

FILE:	DN:	CK:	DW:	CK:
©TxDOT:	CONT	SECT	JOB	HIGHWAY
REVISIONS	0073	02	088,ETC	US 281
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		74

STORMWATER POLLUTION PRVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with TxDOT policy for projects disturbing less than 1 acre of soil, and not part of a larger common plan of development.

For projects with less than one acre of soil disturbing activity and that have Environmental, Permits, Issues, and Commitments (EPICs) dependent on stormwater controls and water quality measures TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office, Area Office, or electronically.

This SWP3 is consistent with requirements specified in applicable stormwater plans, and the project's environmental permits, issues, and commitments (EPICs).

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):
0073-02-088

1.2 PROJECT LIMITS:
From: MARTHA WALK

To: BEXAR/ATASCOSA COUNTY LINE

1.3 PROJECT COORDINATES:
BEGIN: (Lat) 29.1483°N ,(Long) 98.4835°W

END: (Lat) 29.1407°N ,(Long) 98.4839°W

1.4 TOTAL PROJECT AREA (Acres): 3.80 AC

1.5 TOTAL AREA TO BE DISTURBED (Acres): 0.54 AC

1.6 NATURE OF CONSTRUCTION ACTIVITY:
INSTALL CABLE BARRIER

1.7 MAJOR SOIL TYPES:

Soil Type	Description
CLAY/SAND	VARIES BY LOCATION

1.8 PROJECT SPECIFIC LOCATIONS (PSLs):

PSLs must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. PSLs may be identified during preconstruction meetings or during the construction process. Please choose from the options below:

☐ PSLs determined during preconstruction meeting
☐ PSLs determined during construction
☒ No PSLs planned for construction

Type	Sheet #s

All off-ROW PSLs required by the Contractor are the Contractor's responsibility. The Contractor shall secure all permits required by local, state, federal laws for off-ROW PSLs. The contractor shall provide diagrams, areas of disturbance, acreage, and BMPs for all off-ROW PSLs within one mile of the project.

1.9 CONSTRUCTION ACTIVITIES:

(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.3.)

☒ Mobilization
☒ Install sediment and erosion controls
☐ Blade existing topsoil into windrows, prep ROW, clear and grub
☐ Remove existing pavement
☒ Grading operations, excavation, and embankment
☐ Excavate and prepare subgrade for proposed pavement widening
☐ Remove existing culverts, safety end treatments (SETs)
☐ Remove existing metal beam guard fence (MBGF), bridge rail
☐ Install proposed pavement per plans
☐ Install culverts, culvert extensions, SETs
☒ Install mow strip, MBGF, bridge rail
☐ Place flex base
☐ Rework slopes, grade ditches
☐ Blade windrowed material back across slopes
☒ Revegetation of unpaved areas
☒ Achieve site stabilization and remove sediment and erosion control measures
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.10 POTENTIAL POLLUTANTS AND SOURCES:

☒ Sediment laden stormwater from stormwater conveyance over disturbed area
☐ Fuels, oils, and lubricants from construction vehicles, equipment, and storage
☐ Solvents, paints, adhesives, etc. from various construction activities
☐ Transported soils from offsite vehicle tracking
☒ Construction debris and waste from various construction activities
☐ Contaminated water from excavation or dewatering pump-out water
☐ Sanitary waste from onsite restroom facilities
☐ Trash from various construction activities/receptacles
☐ Long-term stockpiles of material and waste
☐ Discharges from concrete washout activities, runoff from concrete cutting activities, and other concrete related activities
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.11 RECEIVING WATERS:

Receiving waters must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. Include Segment # for receiving waters.

Tributaries	Classified Waterbody
N/A	

* Add (*) for impaired waterbodies with pollutant in ().

1.12 ROLES AND RESPONSIBILITIES: TxDOT

☒ Development of plans and specifications
☒ Perform SWP3 inspections
☒ Maintain SWP3 records and update to reflect daily operations
☐ Other: _____
☐ Other: _____

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

☒ Day To Day Operational Control
☒ Maintain schedule of major construction activities
☒ Install, maintain and modify BMPs
☐ Other: _____
☐ Other: _____
☐ Other: _____

STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)

July 2023 Sheet 1 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	SEE TITLE SHEET		75
STATE	STATE DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0073	02	088, ETC	US 281

STORMWATER POLLUTION PRVENTION PLAN (SWP3):

2.0 BEST MANAGEMENT PRACTICES (BMPs) AND CONTROLS, INSPECTION, AND MAINTENANCE

The Contractor shall be the responsible party for implementing the BMPs described herein and for complying with the SWP3 for control of erosion and sedimentation during day-to-day operations. The Contractor shall implement changes to this SWP3 approved by TxDOT within the times specified in this SWP3 or the CGP.

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

- ☐ ☐ Protection of Existing Vegetation
- ☐ ☐ Vegetated Buffer Zones
- ☐ X Soil Retention Blankets
- ☐ ☐ Geotextiles
- ☐ ☐ Mulching/ Hydromulching
- ☐ ☐ Soil Surface Treatments
- ☐ ☐ Temporary Seeding
- ☐ X Permanent Planting, Sodding or Seeding
- ☐ ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Vertical Tracking
- ☐ ☐ Interceptor Swale
- ☐ ☐ Riprap
- ☐ ☐ Diversion Dike
- ☐ ☐ Temporary Pipe Slope Drain
- ☐ ☐ Embankment for Erosion Control
- ☐ ☐ Paved Flumes
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

2.2 SEDIMENT CONTROL BMPs:

T / P

- X ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Dewatering Controls
- ☐ ☐ Inlet Protection
- ☐ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Sandbag Berms
- X ☐ Sediment Control Fence
- ☐ ☐ Stabilized Construction Exit
- ☐ ☐ Floating Turbidity Barrier
- ☐ ☐ Vegetated Buffer Zones
- ☐ ☐ Vegetated Filter Strips
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.3 PERMANENT CONTROLS:

(Coordinate post-construction BMPs with appropriate TxDOT maintenance sections.)

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

- X Excess dirt/mud on road removed daily
- ☐ Haul roads dampened for dust control
- ☐ Loaded haul trucks to be covered with tarpaulin
- ☐ Stabilized construction exit
- ☐ Daily street sweeping
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.5 POLLUTION PREVENTION MEASURES:

- X Chemical Management
- X Concrete and Materials Waste Management
- X Debris and Trash Management
- X Dust Control
- X Sanitary Facilities
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.6 VEGETATED BUFFER ZONES:

Natural vegetated buffers shall be maintained as feasible to protect adjacent surface waters. If vegetated natural buffer zones are not feasible due to site geometry, the appropriate additional sediment control measures have been incorporated into this SWP3.

Type	Stationing	
	From	To

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

- X Fire hydrant flushings
- X Irrigation drainage
- X Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- X Potable water sources
- X Springs
- X Uncontaminated groundwater
- X Water used to wash vehicles or control dust
- X Other allowable non-stormwater discharges as allowed by TPDES GP TXR150000.

2.8 DEWATERING:

Dewatering discharges of accumulated stormwater, groundwater, and surface water including discharges from dewatering of trenches, excavations, foundations, vaults, and other points of accumulation are prohibited unless managed by appropriate controls to prevent and minimize the offsite discharge of sediment and other pollutants.

2.9 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.3 of this SWP3 .

2.10 MAINTENANCE:

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.3 of this SWP3.

STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)

July 2023 Sheet 2 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	SEE TITLE SHEET		76
STATE	STATE DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0073	02	088, ETC	US 281

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with the TPDES Construction General Permit TXR150000 (CGP). The Texas Department of Transportation (TxDOT) ensures that project specifications include adequate best management practices (BMPs) for this project.

For all projects with soil disturbing activity and for projects that have Environmental, Permits, Issues, and Commitments (EPICs) dependent on stormwater controls and water quality measures TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office, Area Office, or electronically.

This SWP3 is consistent with requirements specified in applicable stormwater plans and the projects environmental permits, issues, and commitments (EPICs). A copy of the CGP is included in Attachment 2.12 of the SWP3 binder.

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):
0073-03-072

1.2 PROJECT LIMITS:
From: BEXAR/ATASCOSA COUNTY LINE

To: FM 3006

1.3 PROJECT COORDINATES:
BEGIN: (Lat) 29.1407°N ,(Long) 98.4839°W

END: (Lat) 29.0112°N ,(Long) 98.4773°W

1.4 TOTAL PROJECT AREA (Acres): 66.18 AC

1.5 TOTAL AREA TO BE DISTURBED (Acres): 6.03 AC

1.6 NATURE OF CONSTRUCTION ACTIVITY:
INSTALL CABLE BARRIER

1.7 MAJOR SOIL TYPES:

Soil Type	Description

1.8 PROJECT SPECIFIC LOCATIONS (PSLs):
PSLs must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. PSLs may be identified during preconstruction meetings or during the construction process. Please choose from the options below:

☐ PSLs determined during preconstruction meeting
☐ PSLs determined during construction
☒ No PSLs planned for construction

Type	Sheet #s

All off-ROW PSLs required by the Contractor are the Contractor's responsibility. The Contractor shall secure all permits required by local, state, federal laws for off-ROW PSLs. The contractor shall provide diagrams, areas of disturbance, acreage, and BMPs for all off-ROW PSLs within one mile of the project.

1.9 CONSTRUCTION ACTIVITIES:
(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.5.)

☒ Mobilization
☒ Install sediment and erosion controls
☐ Blade existing topsoil into windrows, prep ROW, clear and grub
☐ Remove existing pavement
☒ Grading operations, excavation, and embankment
☐ Excavate and prepare subgrade for proposed pavement widening
☐ Remove existing culverts, safety end treatments (SETs)
☐ Remove existing metal beam guard fence (MBGF), bridge rail
☐ Install proposed pavement per plans
☐ Install culverts, culvert extensions, SETs
☒ Install mow strip, MBGF, bridge rail
☐ Place flex base
☐ Rework slopes, grade ditches
☐ Blade windrowed material back across slopes
☒ Revegetation of unpaved areas
☒ Achieve site stabilization and remove sediment and erosion control measures
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.10 POTENTIAL POLLUTANTS AND SOURCES:

☒ Sediment laden stormwater from stormwater conveyance over disturbed area
☐ Fuels, oils, and lubricants from construction vehicles, equipment, and storage
☐ Solvents, paints, adhesives, etc. from various construction activities
☐ Transported soils from offsite vehicle tracking
☒ Construction debris and waste from various construction activities
☐ Contaminated water from excavation or dewatering pump-out water
☐ Sanitary waste from onsite restroom facilities
☐ Trash from various construction activities/receptacles
☐ Long-term stockpiles of material and waste
☐

☐ Other: _____
☐ Other: _____
☐ Other: _____

1.11 RECEIVING WATERS:
Receiving waters must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. Include Segment # for receiving waters.

Tributaries	Classified Waterbody

* Add (*) for impaired waterbodies with pollutant in ().

1.12 ROLES AND RESPONSIBILITIES: TxDOT

☒ Development of plans and specifications
☒ Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
☒ Post Construction Site Notice
☒ Submit NOI/CSN to local MS4
☒ Perform SWP3 inspections
☒ Maintain SWP3 records and update to reflect daily operations
☒ Complete and submit Notice of Termination to TCEQ
☒ Maintain SWP3 records for 3 years
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

☒ Day To Day Operational Control
☒ Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
☒ Post Construction Site Notice
☒ Submit NOI/CSN to local MS4
☒ Maintain schedule of major construction activities
☒ Install, maintain and modify BMPs
☒ Complete and submit Notice of Termination to TCEQ
☒ Maintain SWP3 records for 3 years
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.14 LOCAL MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) OPERATOR COORDINATION:

MS4 Entity

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

July 2023 Sheet 1 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	SEE TITLE SHEET		77
STATE	STATE DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0073	02	088,ETC	US 281

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

2.0 BEST MANAGEMENT PRACTICES (BMPs) AND CONTROLS, INSPECTION, AND MAINTENANCE

The Contractor shall be the responsible party for implementing the BMPs described herein and for complying with the SWP3 for control of erosion and sedimentation during day-to-day operations. The Contractor shall implement changes to this SWP3 approved by TxDOT within the times specified in this SWP3 or the CGP.

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

- ☐ ☐ Protection of Existing Vegetation
- ☐ ☐ Vegetated Buffer Zones
- ☐ X Soil Retention Blankets
- ☐ ☐ Geotextiles
- ☐ ☐ Mulching/ Hydromulching
- ☐ ☐ Soil Surface Treatments
- ☐ ☐ Temporary Seeding
- ☐ X Permanent Planting, Sodding or Seeding
- ☐ ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Vertical Tracking
- ☐ ☐ Interceptor Swale
- ☐ ☐ Riprap
- ☐ ☐ Diversion Dike
- ☐ ☐ Temporary Pipe Slope Drain
- ☐ ☐ Embankment for Erosion Control
- ☐ ☐ Paved Flumes
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

2.2 SEDIMENT CONTROL BMPs:

T / P

- X ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Dewatering Controls
- ☐ ☐ Inlet Protection
- ☐ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Sandbag Berms
- X ☐ Sediment Control Fence
- ☐ ☐ Stabilized Construction Exit
- ☐ ☐ Floating Turbidity Barrier
- ☐ ☐ Vegetated Buffer Zones
- ☐ ☐ Vegetated Filter Strips
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

Sediment control BMPs requiring design capacity calculations (See SWP3 Attachment 1.3.):

T / P

- ☐ ☐ Sediment Trap
  - ☐ Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
  - ☐ 3,600 cubic feet of storage per acre drained
- ☐ ☐ Sedimentation Basin
  - ☐ Not required (<10 acres disturbed)
  - ☐ Required (>10 acres) and implemented.
    - ☐ Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
    - ☐ 3,600 cubic feet of storage per acre drained
  - ☐ Required (>10 acres), but not feasible due to:
    - ☐ Available area/Site geometry
    - ☐ Site slope/Drainage patterns
    - ☐ Site soils/Geotechnical factors
    - ☐ Public safety
    - ☐ Other: _____

2.3 PERMANENT CONTROLS:

(Coordinate post-construction BMPs with appropriate TxDOT maintenance sections.)

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

- X Excess dirt/mud on road removed daily
- ☐ Haul roads dampened for dust control
- ☐ Loaded haul trucks to be covered with tarpaulin
- ☐ Stabilized construction exit
- ☐ Daily street sweeping
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.5 POLLUTION PREVENTION MEASURES:

- X Chemical Management
- X Concrete and Materials Waste Management
- X Debris and Trash Management
- X Dust Control
- X Sanitary Facilities
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.6 VEGETATED BUFFER ZONES:

Natural vegetated buffers shall be maintained as feasible to protect adjacent surface waters. If vegetated natural buffer zones are not feasible due to site geometry, the appropriate additional sediment control measures have been incorporated into this SWP3.

Type	Stationing	
	From	To

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

- X Fire hydrant flushings
- X Irrigation drainage
- X Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- X Potable water sources
- X Springs
- X Uncontaminated groundwater
- X Water used to wash vehicles or control dust
- X Other allowable non-stormwater discharges as allowed by TPDES GP TXR150000.

2.8 DEWATERING:

Dewatering discharges of accumulated stormwater, groundwater, and surface water including discharges from dewatering of trenches, excavations, foundations, vaults, and other points of accumulation are prohibited unless managed by appropriate controls to prevent and minimize the offsite discharge of sediment and other pollutants.

2.9 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3.

When dewatering activities are present, a daily inspection will be conducted once per day during those activities and documented in accordance with CGP and TxDOT requirements.

2.10 MAINTENANCE:

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3.

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

July 2023 Sheet 2 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	SEE TITLE SHEET		78
STATE	STATE DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0073	02	088,ETC	US 281

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with the TPDES Construction General Permit TXR150000 (CGP). The Texas Department of Transportation (TxDOT) ensures that project specifications include adequate best management practices (BMPs) for this project.

For all projects with soil disturbing activity and for projects that have Environmental, Permits, Issues, and Commitments (EPICs) dependent on stormwater controls and water quality measures TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office, Area Office, or electronically.

This SWP3 is consistent with requirements specified in applicable stormwater plans and the projects environmental permits, issues, and commitments (EPICs). A copy of the CGP is included in Attachment 2.12 of the SWP3 binder.

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):
0073-04-051

1.2 PROJECT LIMITS:
From: SOUTH OF EUROSTAR DR.

To: IH 37

1.3 PROJECT COORDINATES:
BEGIN: (Lat) 28.9373°N ,(Long) 98.4731°W

END: (Lat) 28.9116°N ,(Long) 98.4388°W

1.4 TOTAL PROJECT AREA (Acres): 19.64 AC

1.5 TOTAL AREA TO BE DISTURBED (Acres): 2.49 AC

1.6 NATURE OF CONSTRUCTION ACTIVITY:

1.7 MAJOR SOIL TYPES:

Soil Type	Description

1.8 PROJECT SPECIFIC LOCATIONS (PSLs):
PSLs must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. PSLs may be identified during preconstruction meetings or during the construction process. Please choose from the options below:

☐ PSLs determined during preconstruction meeting
☐ PSLs determined during construction
☒ No PSLs planned for construction

Type	Sheet #s

All off-ROW PSLs required by the Contractor are the Contractor's responsibility. The Contractor shall secure all permits required by local, state, federal laws for off-ROW PSLs. The contractor shall provide diagrams, areas of disturbance, acreage, and BMPs for all off-ROW PSLs within one mile of the project.

1.9 CONSTRUCTION ACTIVITIES:
(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.5.)

☒ Mobilization
☒ Install sediment and erosion controls
☐ Blade existing topsoil into windrows, prep ROW, clear and grub
☐ Remove existing pavement
☒ Grading operations, excavation, and embankment
☐ Excavate and prepare subgrade for proposed pavement widening
☐ Remove existing culverts, safety end treatments (SETs)
☐ Remove existing metal beam guard fence (MBGF), bridge rail
☐ Install proposed pavement per plans
☐ Install culverts, culvert extensions, SETs
☒ Install mow strip, MBGF, bridge rail
☐ Place flex base
☐ Rework slopes, grade ditches
☐ Blade windrowed material back across slopes
☒ Revegetation of unpaved areas
☒ Achieve site stabilization and remove sediment and erosion control measures
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.10 POTENTIAL POLLUTANTS AND SOURCES:

☒ Sediment laden stormwater from stormwater conveyance over disturbed area
☐ Fuels, oils, and lubricants from construction vehicles, equipment, and storage
☐ Solvents, paints, adhesives, etc. from various construction activities
☐ Transported soils from offsite vehicle tracking
☒ Construction debris and waste from various construction activities
☐ Contaminated water from excavation or dewatering pump-out water
☐ Sanitary waste from onsite restroom facilities
☐ Trash from various construction activities/receptacles
☐ Long-term stockpiles of material and waste
☐

☐ Other: _____
☐ Other: _____
☐ Other: _____

1.11 RECEIVING WATERS:
Receiving waters must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. Include Segment # for receiving waters.

Tributaries	Classified Waterbody

* Add (*) for impaired waterbodies with pollutant in ().

1.12 ROLES AND RESPONSIBILITIES: TxDOT

☒ Development of plans and specifications
☒ Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
☒ Post Construction Site Notice
☒ Submit NOI/CSN to local MS4
☒ Perform SWP3 inspections
☒ Maintain SWP3 records and update to reflect daily operations
☒ Complete and submit Notice of Termination to TCEQ
☒ Maintain SWP3 records for 3 years
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

☒ Day To Day Operational Control
☒ Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
☒ Post Construction Site Notice
☒ Submit NOI/CSN to local MS4
☒ Maintain schedule of major construction activities
☒ Install, maintain and modify BMPs
☒ Complete and submit Notice of Termination to TCEQ
☒ Maintain SWP3 records for 3 years
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.14 LOCAL MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) OPERATOR COORDINATION:

MS4 Entity

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

 July 2023 Sheet 1 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	SEE TITLE SHEET		79
STATE	STATE DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0073	02	088,ETC	US 281

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

2.0 BEST MANAGEMENT PRACTICES (BMPs) AND CONTROLS, INSPECTION, AND MAINTENANCE

The Contractor shall be the responsible party for implementing the BMPs described herein and for complying with the SWP3 for control of erosion and sedimentation during day-to-day operations. The Contractor shall implement changes to this SWP3 approved by TxDOT within the times specified in this SWP3 or the CGP.

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

- ☐ ☐ Protection of Existing Vegetation
- ☐ ☐ Vegetated Buffer Zones
- ☐ X Soil Retention Blankets
- ☐ ☐ Geotextiles
- ☐ ☐ Mulching/ Hydromulching
- ☐ ☐ Soil Surface Treatments
- ☐ ☐ Temporary Seeding
- ☐ X Permanent Planting, Sodding or Seeding
- ☐ ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Vertical Tracking
- ☐ ☐ Interceptor Swale
- ☐ ☐ Riprap
- ☐ ☐ Diversion Dike
- ☐ ☐ Temporary Pipe Slope Drain
- ☐ ☐ Embankment for Erosion Control
- ☐ ☐ Paved Flumes
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

2.2 SEDIMENT CONTROL BMPs:

T / P

- X ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Dewatering Controls
- ☐ ☐ Inlet Protection
- ☐ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Sandbag Berms
- X ☐ Sediment Control Fence
- ☐ ☐ Stabilized Construction Exit
- ☐ ☐ Floating Turbidity Barrier
- ☐ ☐ Vegetated Buffer Zones
- ☐ ☐ Vegetated Filter Strips
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

Sediment control BMPs requiring design capacity calculations (See SWP3 Attachment 1.3.):

T / P

- ☐ ☐ Sediment Trap
  - ☐ Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
  - ☐ 3,600 cubic feet of storage per acre drained
- ☐ ☐ Sedimentation Basin
  - ☐ Not required (<10 acres disturbed)
  - ☐ Required (>10 acres) and implemented.
    - ☐ Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
    - ☐ 3,600 cubic feet of storage per acre drained
  - ☐ Required (>10 acres), but not feasible due to:
    - ☐ Available area/Site geometry
    - ☐ Site slope/Drainage patterns
    - ☐ Site soils/Geotechnical factors
    - ☐ Public safety
    - ☐ Other: _____

2.3 PERMANENT CONTROLS:

(Coordinate post-construction BMPs with appropriate TxDOT maintenance sections.)

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

- X Excess dirt/mud on road removed daily
- ☐ Haul roads dampened for dust control
- ☐ Loaded haul trucks to be covered with tarpaulin
- ☐ Stabilized construction exit
- ☐ Daily street sweeping
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.5 POLLUTION PREVENTION MEASURES:

- X Chemical Management
- X Concrete and Materials Waste Management
- X Debris and Trash Management
- X Dust Control
- X Sanitary Facilities
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.6 VEGETATED BUFFER ZONES:

Natural vegetated buffers shall be maintained as feasible to protect adjacent surface waters. If vegetated natural buffer zones are not feasible due to site geometry, the appropriate additional sediment control measures have been incorporated into this SWP3.

Type	Stationing	
	From	To

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

- X Fire hydrant flushings
- X Irrigation drainage
- X Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- X Potable water sources
- X Springs
- X Uncontaminated groundwater
- X Water used to wash vehicles or control dust
- X Other allowable non-stormwater discharges as allowed by TPDES GP TXR150000.

2.8 DEWATERING:

Dewatering discharges of accumulated stormwater, groundwater, and surface water including discharges from dewatering of trenches, excavations, foundations, vaults, and other points of accumulation are prohibited unless managed by appropriate controls to prevent and minimize the offsite discharge of sediment and other pollutants.

2.9 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3.

When dewatering activities are present, a daily inspection will be conducted once per day during those activities and documented in accordance with CGP and TxDOT requirements.

2.10 MAINTENANCE:

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3.

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

July 2023 Sheet 2 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	SEE TITLE SHEET		80
STATE	STATE DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0073	02	088,ETC	US 281

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I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

Texas Pollutant Discharge Elimination System (TPDES) TXR 150000: Stormwater Discharge Permit or Construction General Permit (CGP) required for projects with 1 or more acres distrubed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

☐ No Action Required ☒ Required Action

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000.
2. Comply with the Storm Water Pollution Prevention Plan (SW3P) and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and Texas Commission on Environmental Quality (TCEQ), Environmental Protection Agency (EPA) or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, Contractor shall submit Notice of Intent (NOI) to TCEQ and the Engineer.
5. NOI required: ☐Yes ☒No

Note: If amount of soil disturbance changes, permit requirements may change.

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404

US Army Corps of Engineers (USACE) Permit required for filling, dredging, excavating or other work in any potential USACE jurisdictional water, such as, rivers, creeks, streams, or wetlands.

The Contractor shall adhere to all of the terms and conditions associated with the following permit(s):

☒ No Permit Required
☐ Nationwide Permit (NWP) 14 - Pre-construction Notice (PCN) not Required
☐ Nationwide Permit 14 - PCN Required
☐ Individual 404 Permit Required
☐ Other Nationwide Permit Required: NWP# _____

Required Actions: List waters of the US permit applies to, location in project and check Best Management Practices (BMPs) planned to control erosion, sedimentation and post-project total suspended solids (TSS).

1.

2.

3.

4.

401 Best Management Practices: (Not applicable if no USACE permit)

Erosion	Sedimentation	Post-Construction TSS
☐ Temporary Vegetation	☒ Silt Fence	☐ Vegetative Filter Strips
☐ Blankets/Matting	☐ Rock Berm	☐ Retention/Irrigation Systems
☐ Mulch	☐ Triangular Filter Dike	☐ Extended Detention Basin
☐ Sodding	☐ Sand Bag Berm	☐ Constructed Wetlands
☐ Interceptor Swale	☐ Straw Bale Dike	☐ Wet Basin
☐ Diversion Dike	☐ Brush Berms	☐ Erosion Control Compost
☐ Erosion Control Compost	☐ Erosion Control Compost	☐ Mulch Filter Berm and Socks
☐ Mulch Filter Berm and Socks	☒ Mulch Filter Berm and Socks	☐ Compost Filter Berm and Socks
☐ Compost Filter Berm and Socks	☐ Compost Filter Berm and Socks	☐ Vegetation Lined Ditches
	☐ Stone Outlet Sediment Traps	☐ Sand Filter Systems
	☐ Sediment Basins	☐ Sedimentation Chambers
		☐ Grassy Swales

III. CULTURAL RESOURCES

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately.

☒ No Action Required ☐ Required Action

Action No.

1.

2.

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical. Contractor must adhere to Construction Specification Requirements Specs 162,164, 192, 193, 506, 730, 751, 752 in order to comply with requirements for invasive species, beneficial landscaping, and tree/brush removal commitments.

☒ No Action Required ☐ Required Action

Action No.

1.

2.

V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS.

☐ No Action Required ☒ Required Action

Action No.

1. MIGRATORY BIRD NESTS: Schedule construction activities as needed to meet the following requirements:

   A. Do not remove or destroy any active migratory bird nests (nests containing eggs and/or flightless birds) at any time of year. If there are any active nests, they shall not be removed until the nests become inactive.

   B. On/in structures, if there are any active nests, they shall not be removed until all nests become inactive. After inactive nests are removed and/or before nest activity begins, deterrent materials may be applied to the structures to prevent future nest building.

2. See Item 5 in General Notes.
3.
4.

If any of the listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately. The work may not remove active nests from bridges and other structures during nesting season of the birds associated with the nests. If caves or sinkholes are discovered, cease work in the immediated area, and contact the Engineer immediately.

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropriate for any hazardous materials used.

Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act.

Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the follwing are detected:
* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canister, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

Hazardous Materials or Contamination Issues Specific to this Project:

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

Does the project involve the demolition of a span bridge?

☐ Yes ☒ No (No further action required)

If "Yes", a pre- demolition notification must be submitted to the Texas Department of State Health Services. The contractor shall contact TxDOT's Project Engineer 25 calendar days prior to the demolition of the bridges(s) on the project to assist with the notification.

VII. OTHER ENVIRONMENTAL ISSUES

(includes regional issues such as Edwards Aquifer District, etc.)

☒ No Action Required ☐ Required Action

Action No.

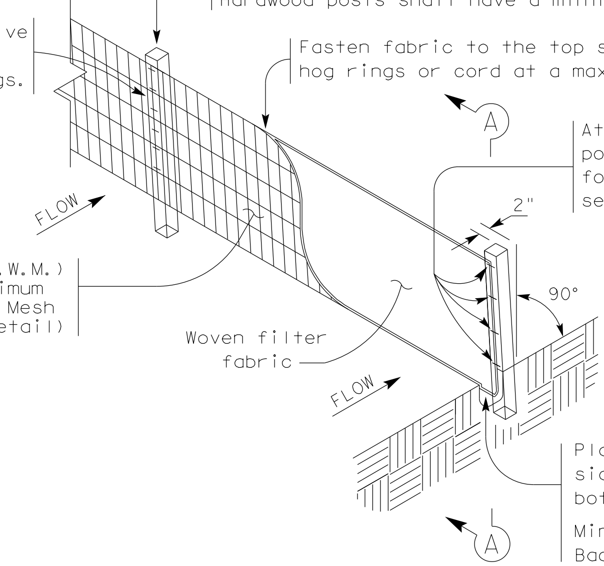
1.

Texas Department of Transportation
San Antonio District Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

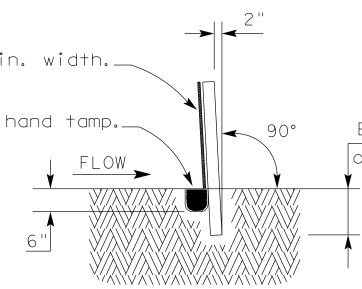
EPIC

FILE: epic_2015-10-09_SAT.dgn	DN: TxDOT	CK: TxDOT	DW: BW	CK: GAG
©TxDOT OCTOBER 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0073	02	088,ETC	US 281
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		81

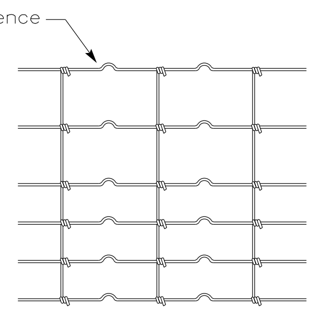


TEMPORARY SEDIMENT CONTROL FENCE

SCF



SECTION A-A



HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

Galvanized hinge joint knot woven mesh (12.5 GA.SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.

SEDIMENT CONTROL FENCE USAGE GUIDELINES

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT^2. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

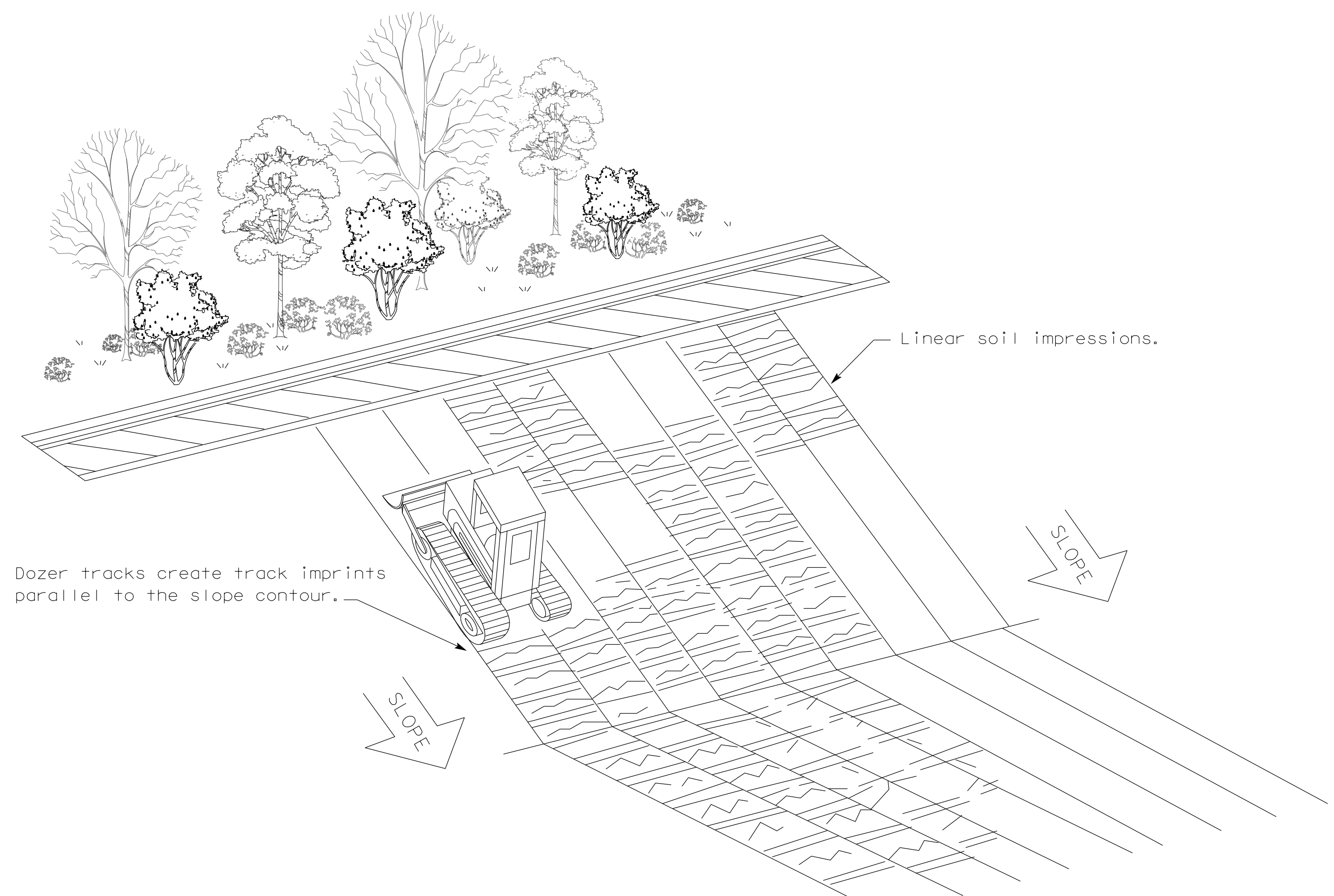
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum of 12" in length by 2" to 4" in width by 1/2" to 2" in depth.
4. Do not exceed 12" between track impressions.
5. Install continous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

EC(1)-16

FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0073	02	088,ETC	US 281
	DIST		COUNTY	SHEET NO.
	SAT		BEXAR	82

DATE: 3/19/2024
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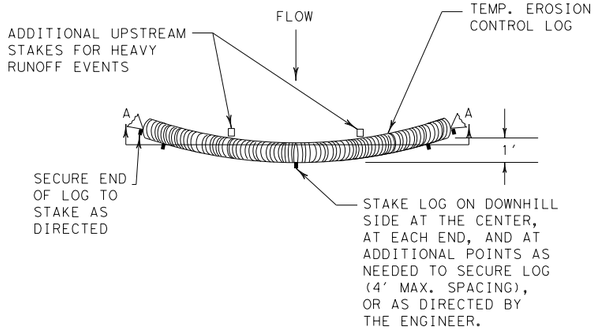
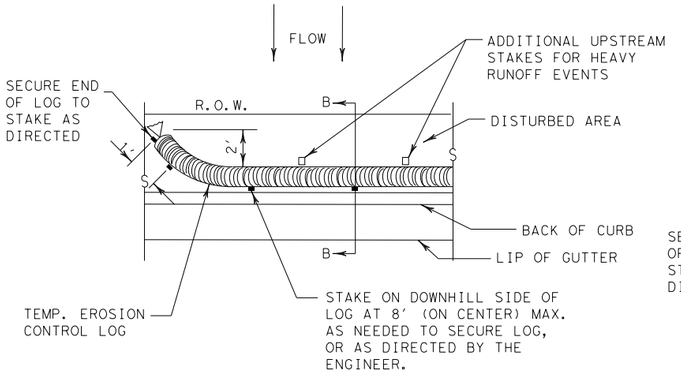
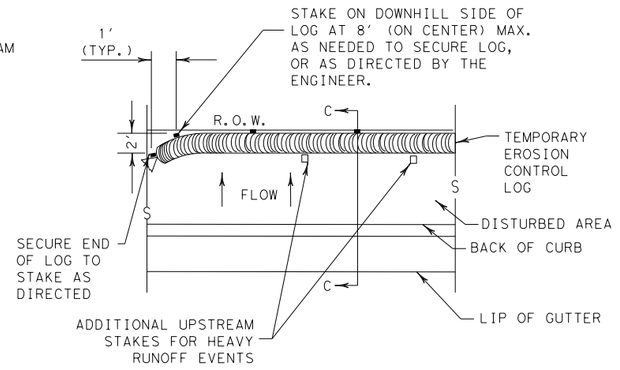


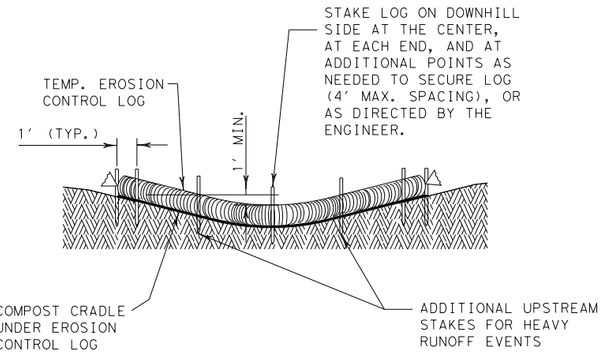
PLAN VIEW



PLAN VIEW



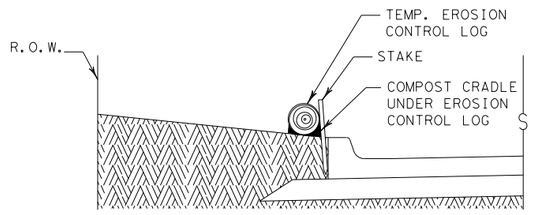
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

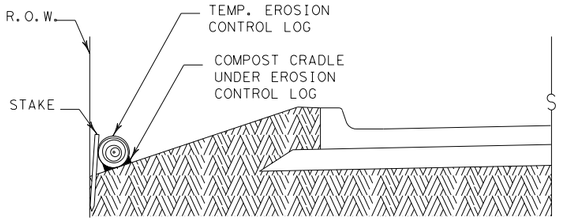
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

CL-BOC



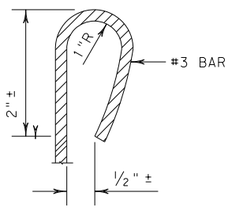
SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW

LEGEND

- CL-D — EROSION CONTROL LOG DAM
- CL-BOC — EROSION CONTROL LOG AT BACK OF CURB
- CL-ROW — EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
- CL-SST — EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
- CL-SSL — EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
- CL-DI — EROSION CONTROL LOG AT DROP INLET
- CL-CI — EROSION CONTROL LOG AT CURB INLET
- CL-GI — EROSION CONTROL LOG AT CURB & GRATE INLET



REBAR STAKE DETAIL

GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
4. FILL LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE THE MINIMUM COMPACTED DIAMETER SPECIFIED IN THE PLANS WITHOUT EXCESSIVE DEFORMATION.
5. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 2'-4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED BY THE ENGINEER.
6. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.
7. COMPOST CRADLE MATERIAL IS INCIDENTAL & WILL NOT BE PAID FOR SEPARATELY.
8. SANDBAGS USED AS ANCHORS SHALL BE PLACED ON TOP OF LOGS & SHALL BE OF SUFFICIENT SIZE TO HOLD LOGS IN PLACE.
9. TURN THE ENDS OF EACH ROW OF LOGS UPSLOPE TO PREVENT RUNOFF FROM FLOWING AROUND THE LOG.
10. FOR HEAVY RUNOFF EVENTS, ADDITIONAL UPSTREAM STAKES MAY BE NECESSARY TO KEEP LOG FROM FOLDING IN ON ITSELF.

SEDIMENT BASIN & TRAP USAGE GUIDELINES

An erosion control log sediment trap may be used to filter sediment out of runoff draining from an unstabilized area.

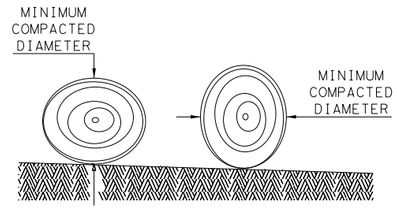
Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

Control logs should be placed in the following locations:

1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets or drain inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way
5. Just before the drainage leaves the construction limits where drainage flows away from the project.

The logs should be cleaned when the sediment has accumulated to a depth of 1/2 the log diameter.

Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for separately.



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

SHEET 1 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0073	02	088,ETC	US 281
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		83

DATE: 3/19/2024
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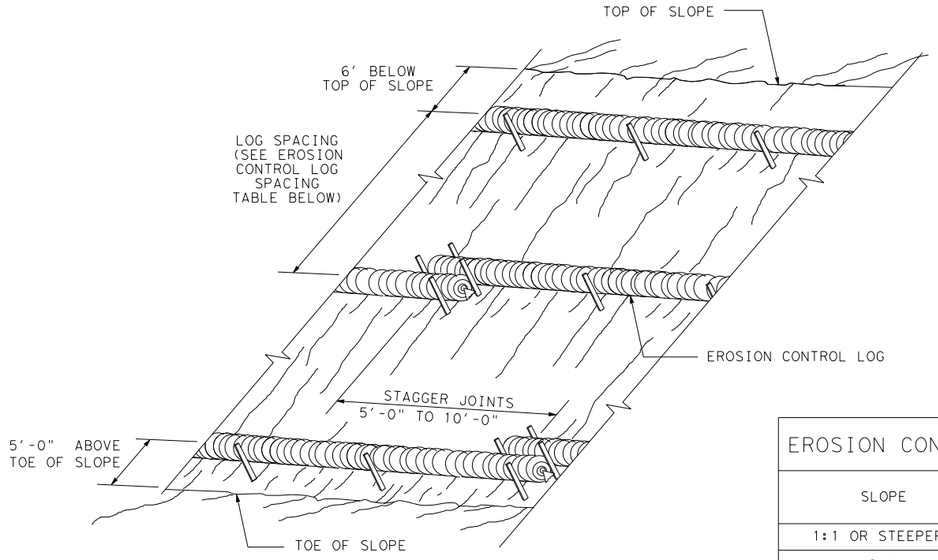
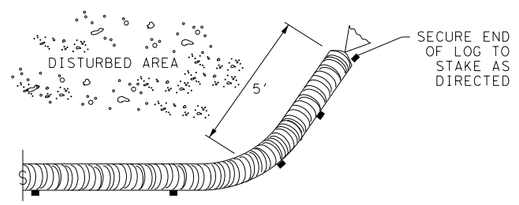


EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

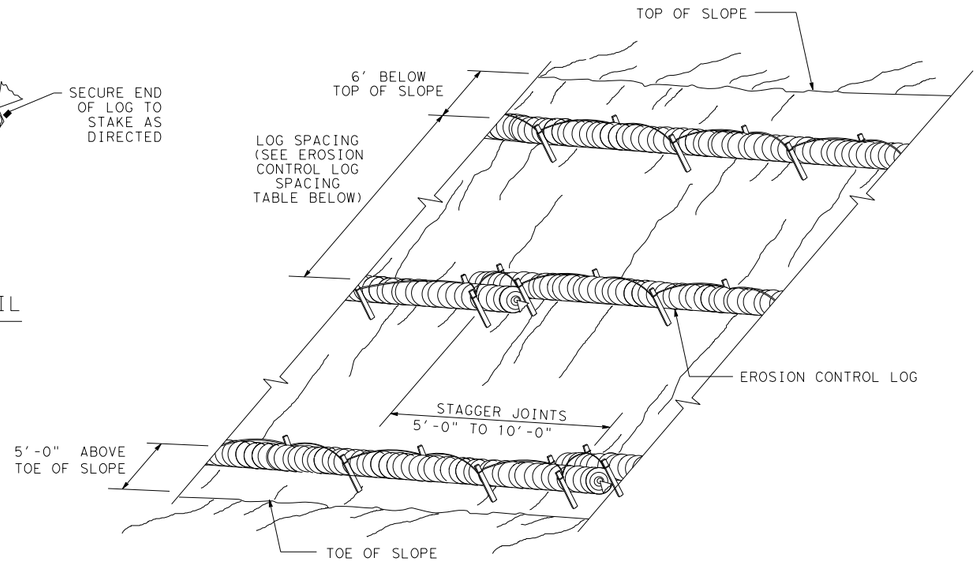
CL-SST



END SECTION RAP DETAIL

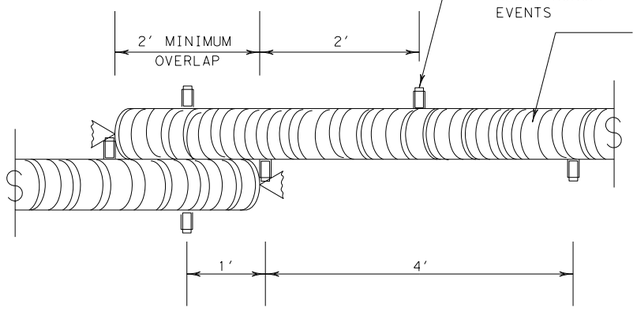
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

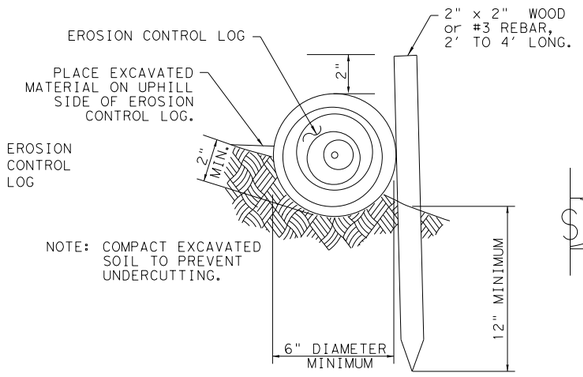
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

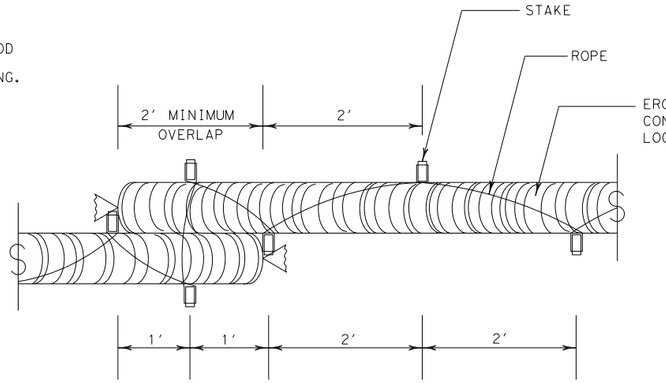


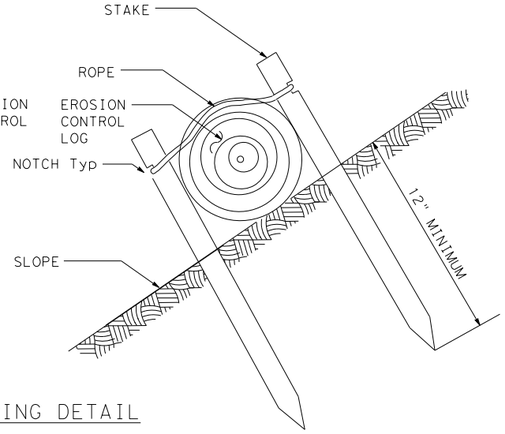


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

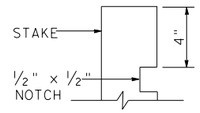
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

SHEET 2 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec116	DN: TxDOT		CK: KM		DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0073	02	088,ETC		US 281	
	DIST	COUNTY			SHEET NO.	
	SAT	BEXAR			84	

DATE: 3/19/2024
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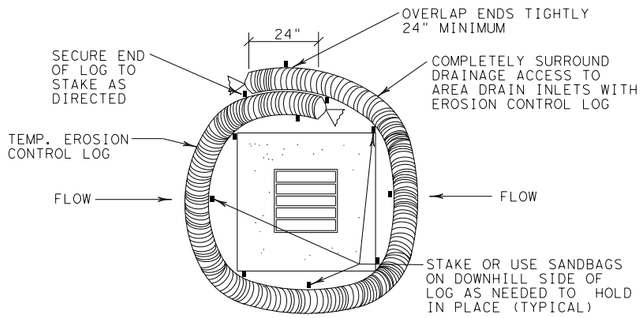
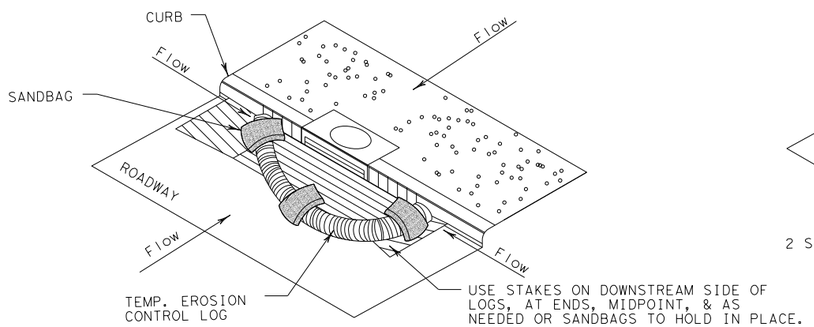


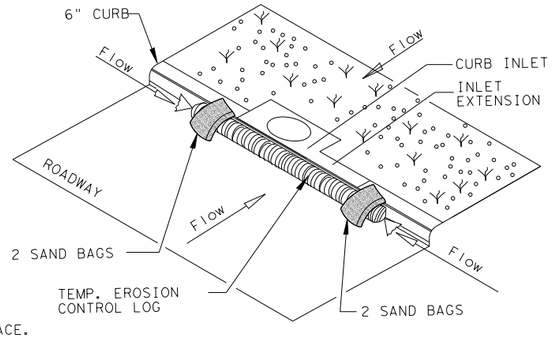
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

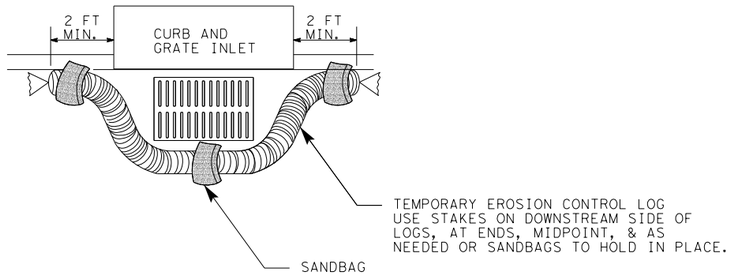
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

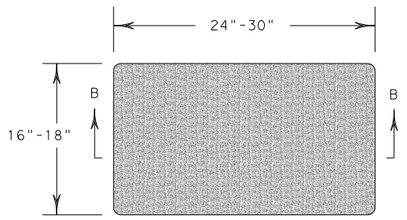
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI

SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT		CK: KM		DW: LS/PT		CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0073	02	088,ETC		US 281		
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	SAT	BEXAR			85		